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A COMPILATION OF MOORED CURRENT DATA AND ASSOCIATED OCEANOGRAPH--ETC(U)  
MAY 76 S A TARBELL

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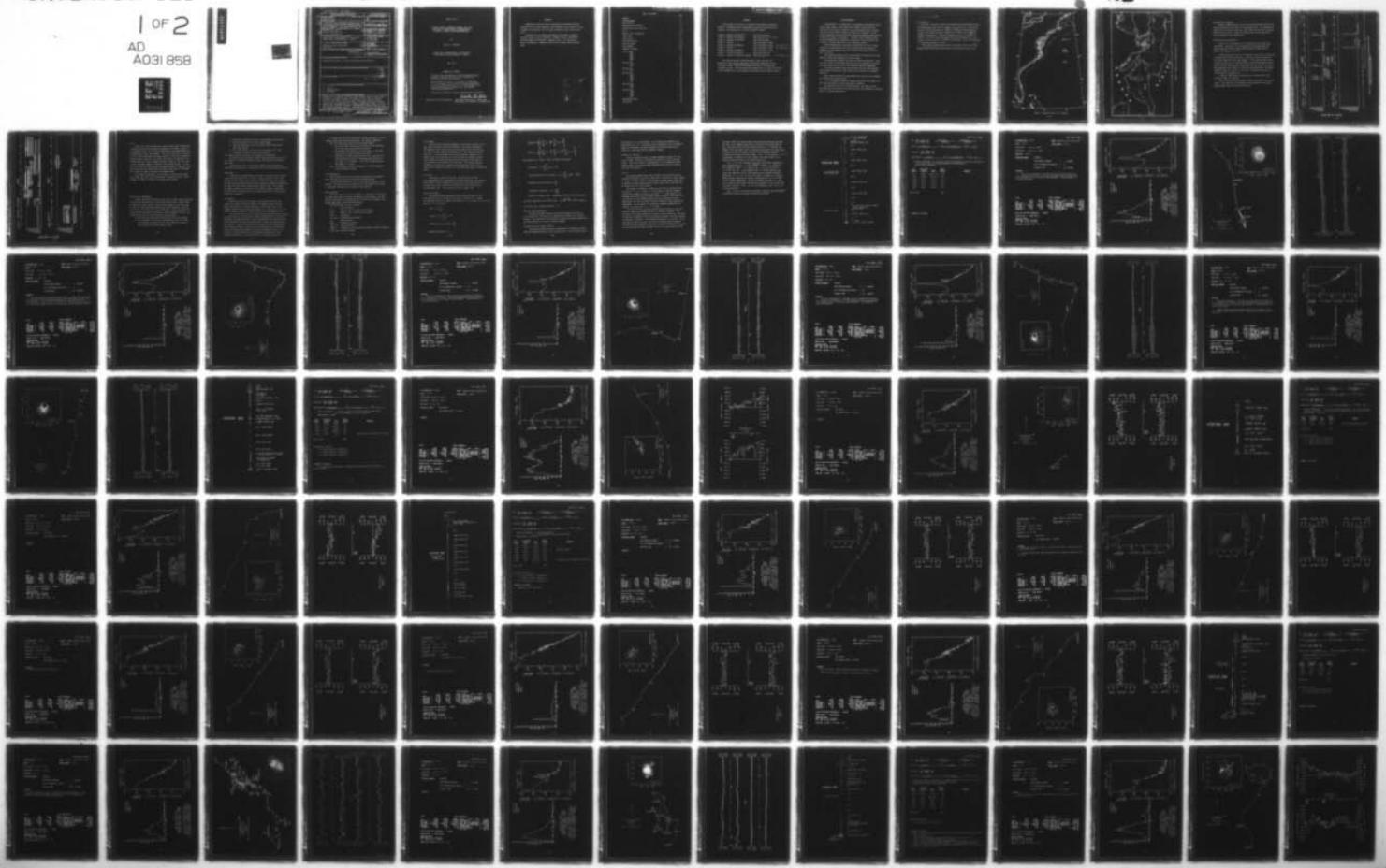
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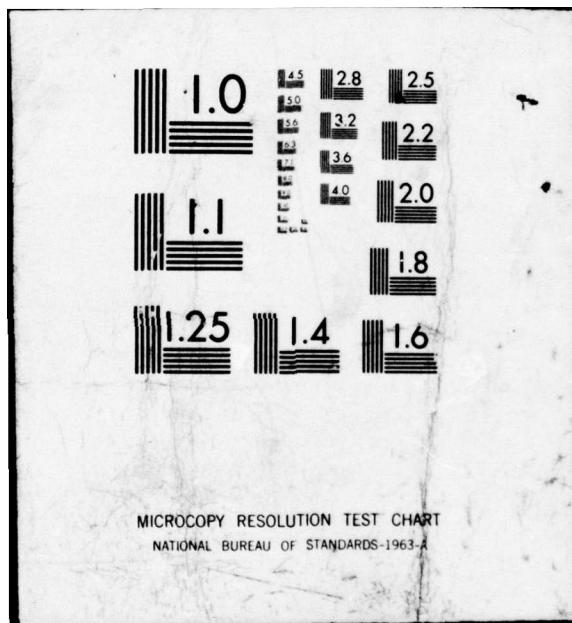
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A COMPILATION OF MOORED CURRENT DATA AND  
ASSOCIATED OCEANOGRAPHIC OBSERVATIONS,  
VOLUME X (EARLY 1969 MEASUREMENTS)

by

Susan A. Tarbell

WOODS HOLE OCEANOGRAPHIC INSTITUTION  
Woods Hole, Massachusetts 02543

May 1976

TECHNICAL REPORT

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Valentine Worthington

Approved for Distribution: Valentine Worthington, Chairman  
Department of Physical Oceanography

## ABSTRACT

Summaries of wind and current observations from moored stations gathered in early 1969 by magnetic tape recording current meters and wind recorders are presented, also selected hydrostation data from the same areas.

Averaged wind and current variables are presented in computer generated output as basic STATISTICS, SPECTRA diagrams, PROGRESSIVE VECTOR diagrams and EAST-NORTH component plots. The hydrostation data are presented as temperature and salinity values plotted against depth.

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## PREFACE

This volume is the tenth of a series of Data Reports intended to present, in summarized form, measurements collected from moored ocean stations. The following is a list of preceding reports.

Volume 1 - Webster and Fofonoff	Data from mid 1963
Volume 2 - Webster and Fofonoff	Data from XII-'63 to V-'64
Volume 3 - Webster and Fofonoff	Data from mid 1964
Volume 4 - Pollard	Data collected in 1965
Volume 5 - Tarbell and Webster	Data collected in 1966 - AD-730 466
Volume 6 - Tarbell	Data collected in 1967 - AD-782 366
Volume 7 - Chausse and Tarbell	Data collected in 1968
Volume 8 - Pollard and Tarbell	Array data from 1970
Volume 9 - Tarbell, Briscoe and Chausse	IWEX data from 1973 - AD-A022 552

The back-up recovery system designed in 1968 (Berteaux and Heinmiller, 1969, W.H.O.I. Ref. 69-7 (unpublished manuscript) proved its worth in 1969. Tests of wire samples and wire in moorings were continued in 1969. The Gulf Stream went through Site D in April resulting in fish bite damage and a re-evaluation of mooring lines and anchor weights.

#### ACKNOWLEDGMENTS

Unfortunately it is impossible to acknowledge individually everyone who gave support to the Moored Buoy Program in any given year. Ideas from any source are valuable to a growing project and of course the skills of the project support personnel are invaluable. As the Project expanded, more people became involved and specialization started to divide the group into segments. The basic groups became oriented around Instrumentation, Engineering, Operations, Data Processing and of course, the glue that holds us all together, Science.

The instrumentation group became responsible not only for maintaining the instruments but also for improving them and designing equipment to test them for the various malfunctions seen in the lab and in the data.

The engineers design and test new mooring configurations and components to meet more demanding scientific needs.

The operations personnel are also the sea-going personnel. They set and retrieve the moorings and maintain all the equipment necessary for these operations as well as the individual mooring components.

The data processors decode the data and edit out known problems, then arrange the data into forms used by the scientists to interpret the data.

The scientists devise the experiments that the Buoy Group handles and evaluate the returning data.

It is the splendid cooperation among these groups that makes the Buoy Group successful and this Data Report necessary.

The patience and skill of Audrey Williams, who typed the text and tables for this report and of Ann Whitlatch, who prepared the computer plots, is greatly appreciated.

cont fr P 1473R

Data Location

► The data collected in 1969 were gathered from four different sites: the Mediterranean Sea, the Gulf Stream, Site L and Site D. Mooring 289 was set in the Mediterranean at  $38^{\circ}01'N$ ,  $04^{\circ}59.9'E$ ; moorings 304 and 305 were Gulf Stream moorings at  $36^{\circ}23.4'N$ ,  $70^{\circ}00.2'W$  and  $36^{\circ}43'N$ ,  $70^{\circ}00.3'W$  respectively. Mooring 314 was set at Site L at  $34^{\circ}02.7'N$ ,  $70^{\circ}02'W$ . The rest of the data were collected from moorings set in the vicinity of Site D,  $39^{\circ}10'N$ ,  $70^{\circ}00'W$ . See figures 1 and 2 for positions of the moorings relative to land.

► This report presents data from the first part of 1969 only. See W.H.O.I. Ref. 76-41 (unpublished manuscript) for data from late 1969.

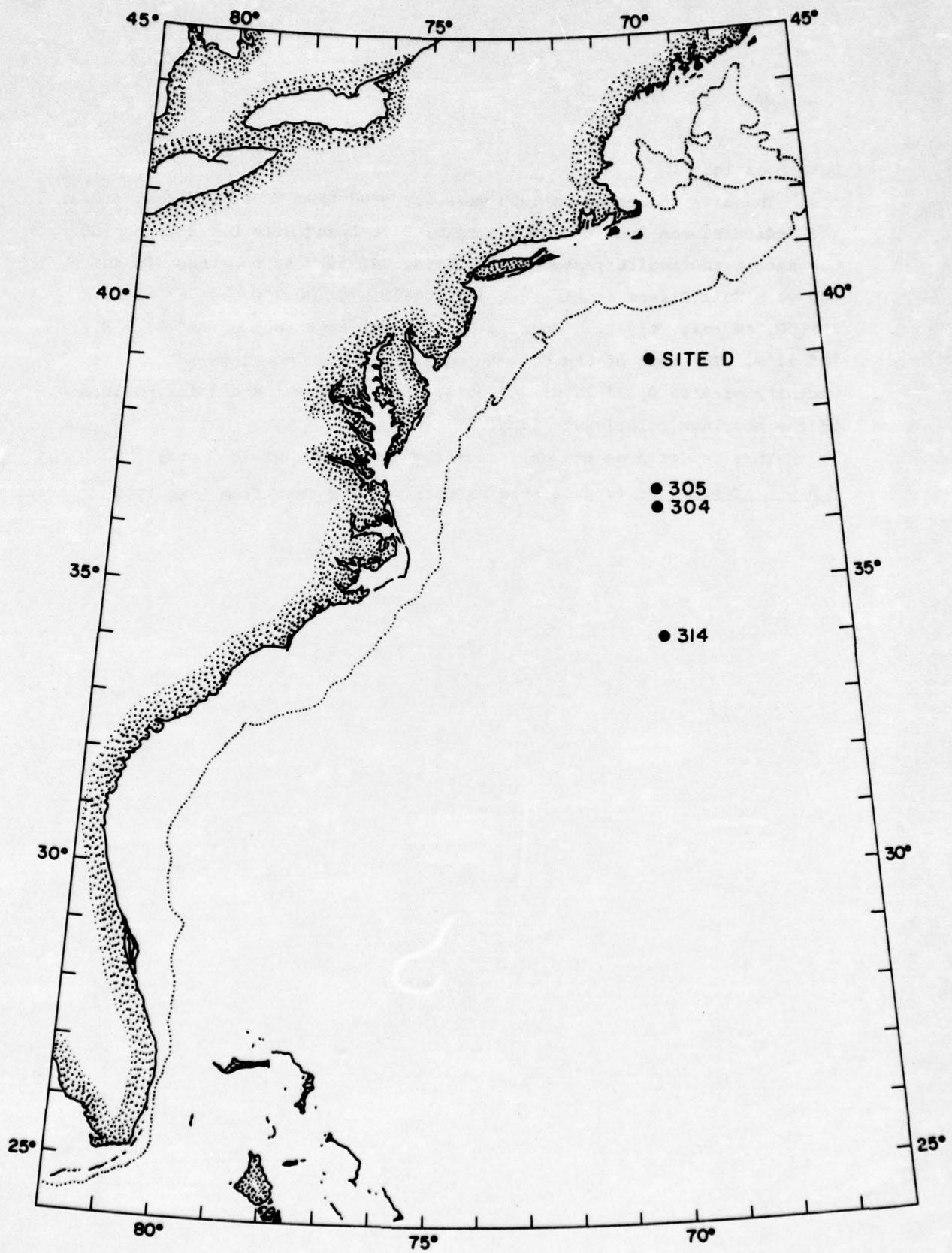


Figure 1 Mooring Sites in N.W. Atlantic

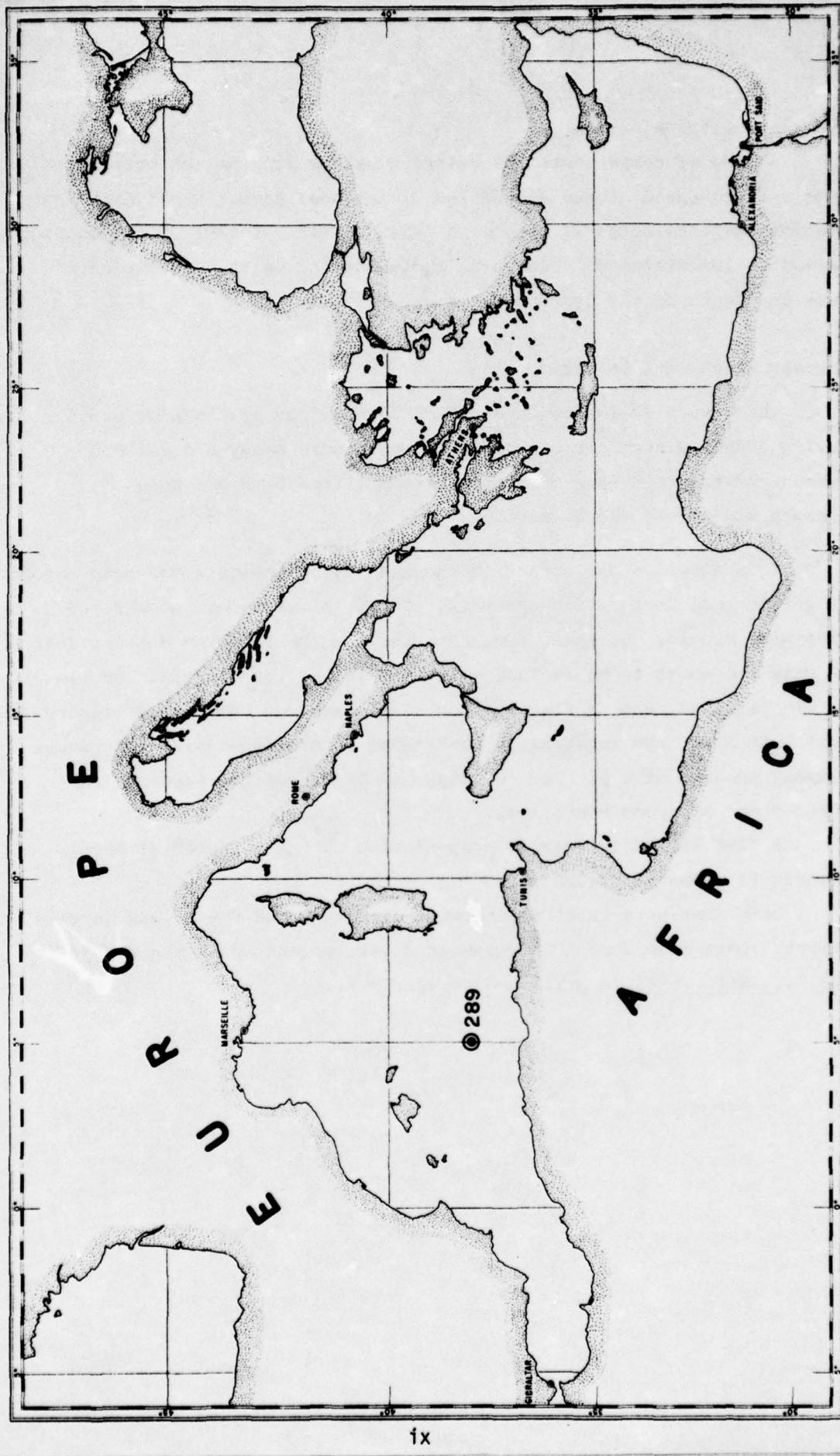


Figure 2 Mooring Site in Mediterranean Sea

#### Hydrocast Data Selection

Graphs of temperature and salinity values from Nansen bottle readings are presented at the end of the directional data. The hydrographic stations were selected if they were taken within two days of the mooring period in the vicinity. Figure 3A indicates the relative position in time and depth of the hydrocast data.

#### Current Meter Data Selection

There were 72 instruments set on 35 moorings by the Buoy Group during 1969. Sixty-four of the instruments were Geodyne model 850 current meter and 8 were current meters modified by Woods Hole to measure wind speed and direction.

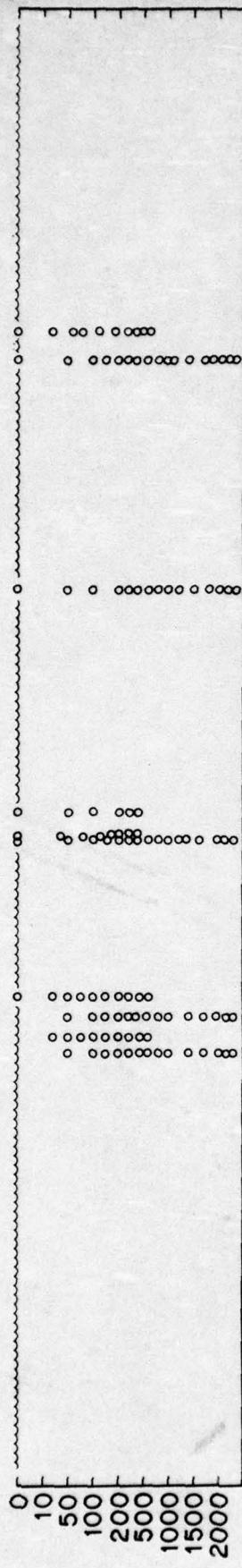
A data series was chosen if the quality of the data was good enough to permit basic scientific analysis. Thirty-six current records and five wind records met these requirements. Of the rejected data series, 12 were too short to be included; another 11 had various kinds of electronic failures ranging from writing blank tape for one bits to instrument switching from interval to continuous recording mode; 1 instrument flooded because of a pinched 'O' ring and 7 instruments were not recovered and are considered lost.

A TIME vs. DEPTH graphic presentation of the selected 41 data records is shown in figure 3B.

Data that were initiated between January 1 and May 31 are in this report. Data from June 1 to December 31 are presented in the report W.H.O.I. Ref. 76-41 (unpublished manuscript).

SITE 'D' 39°10'N 70°00'W

+ JAN. + FEB. + MARCH + APRIL + MAY + JUNE + JULY + AUG. + SEPT. + OCT. + NOV. + DEC. -



DEPTH IN METERS

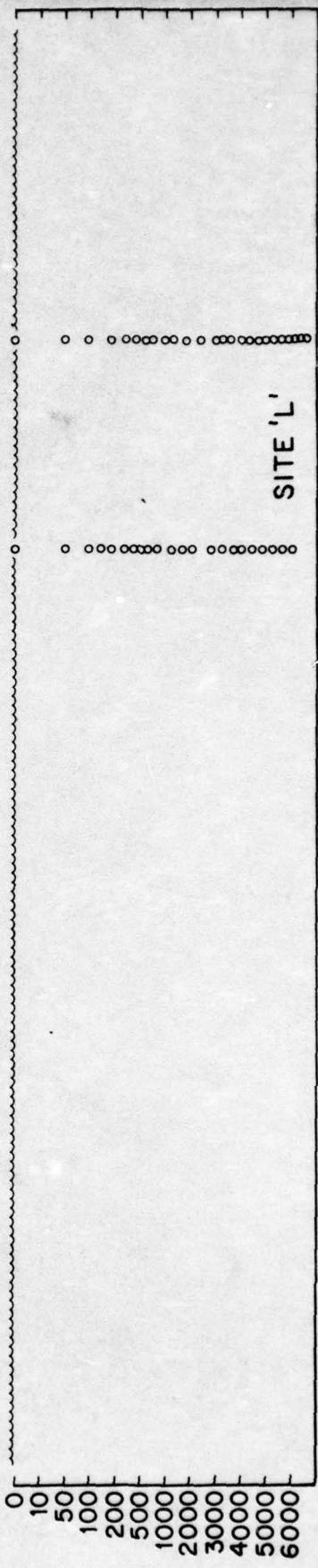
x

1969

AN-53-1552  
AN-53-1550  
CI-90-879  
CI-90-878  
CI-90-873  
CI-90-872  
CI-90-898  
CI-92-896

NON-SITE 'D'

+ JAN. + FEB. + MARCH + APRIL + MAY + JUNE + JULY + AUG. + SEPT. + OCT. + NOV. + DEC. -



SITE 'L'

AN-53-1551  
CI-95-924

W.H.O.I. Ref. 76-40  
W.H.O.I. Ref. 76-41

Figure 3A Selected Hydro Stations Collected near Mooring and Plotted According to Date and Sensor Depth

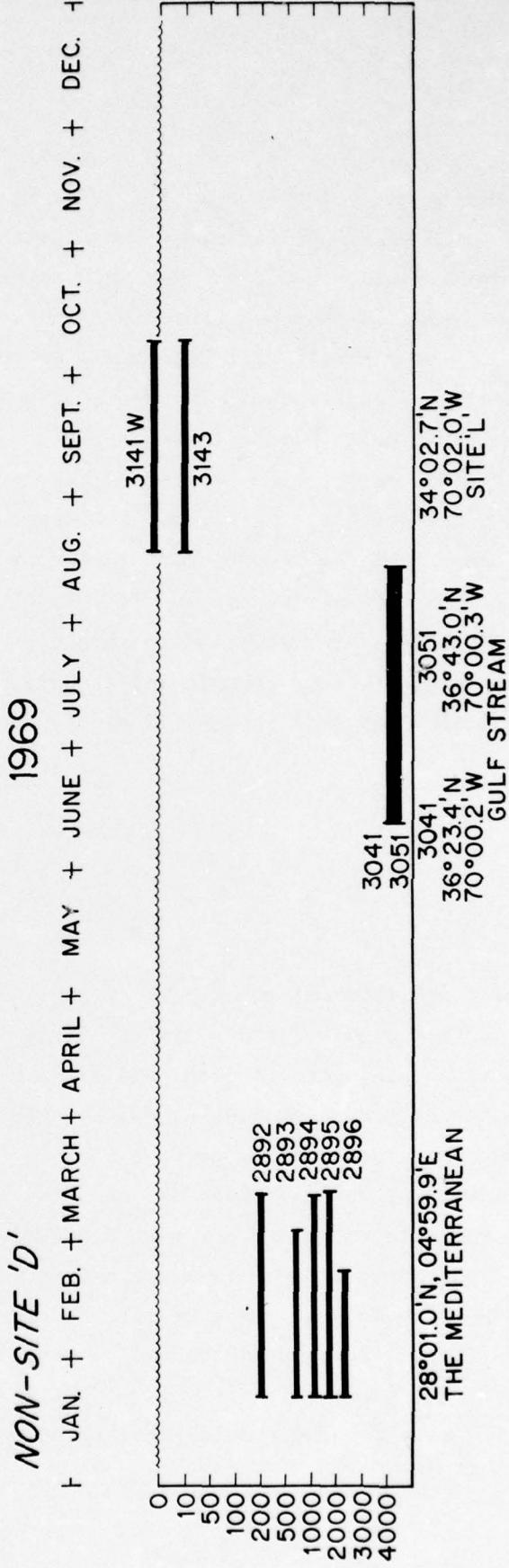
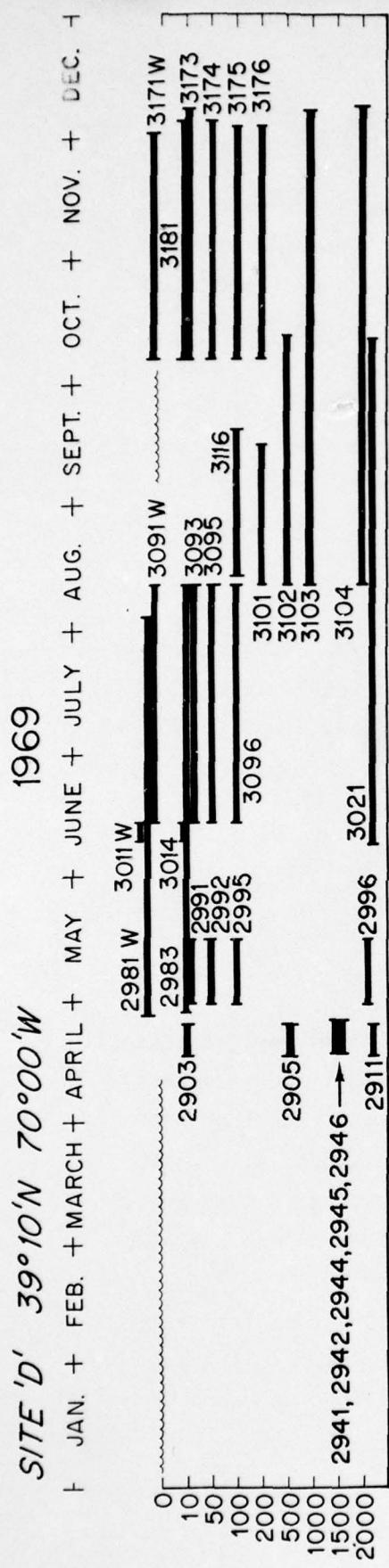


Figure 3B Wind and Current Meter Data Duration Plotted According to Time and Sensor Depth

### Clock

During early 1969 the model 850 current meters used two mechanical clocks which were wound up every two minutes by a solenoid, similar to an automobile clock. One of these clocks made 1-hour measurements and the other made 12-hour measurements. The 1-hour clock had a 4 lobe cam on the one-hour shaft which actuated a switch to turn on the recording sequence every 15 minutes. The second clock had a one lobe cam on the 12-hour shaft which also actuated a switch to insert in the data train, a 4 bit instrument number to identify 12-hour record cycles. It also served to re-arm the stop circuit that operates when the tape foil comes up at the end of the second channel of tape to shut off the instrument. The accuracy of these clocks was  $\pm 10$  seconds per day.

Data times are specified in this report in the following order: year, month, day, hour, minute and second. Therefore 69-IV-16 115712 is April 16, 1969 at 11 hours, 57 minutes and 12 seconds.

### Back-up Clock Information

Another time-related activity, first tried in April, puts artificial events at the beginning and the end of each data record. These events, at known real times, provide a check on the accuracy of the clock and in case of a clock problem provide back-up time information with which the accuracy of the time base can be determined. This has proved to be a very valuable procedure for mechanical clock instruments and has also simplified the task of assigning times to data records.

The procedure to place artificial events on tape is as follows:

- A) The instrument is turned on and allowed to run for at least two recording intervals with its rotor taped so it cannot move causing a zero rotor speed on tape.

- B) During the recording cycles of two succeeding records untape the rotor and spin it to cause a speed spike.
- C) Tape the rotor again until just before launch causing more zero rotor speeds.
- D) Do not turn either the clock or the recording part of the instrument off between events and launching.

The reverse procedure applies to the recovery of instruments.

The time when the instrument started recording and the times of the rotor spins are recorded according to radio time signals from stations WWV or CHU.

This procedure also is useful with digital clock instruments in cases where the oscillator is correct but the clock word is malfunctioning.

#### SHEAR TIME

A program called SHEAR TIME was devised to establish best estimates of time for continuous 850 C. M. data. First, provisional linear corrections for the large clock drift rates (minutes per day) were applied, then the intervals between clock switch closures were displayed graphically. The time rate could then be adjusted with as many linear rate changes as needed to smooth the variations in the switch closures. SHEAR TIME was only used on continuous 850 current meter data which used mechanical clocks for a time base.

#### Data Editing

Data from both the old mechanical clock model 850 and the new crystal clock model 850 are recorded on 1/4" magnetic tape. The data were transcribed onto computer compatible 7-track tape using a PDP-5 computer (manufactured by Digital Equipment Co.). The data were then converted to Maltais format (J. Maltais, 1969) on 9-track magnetic tape.

Once the data are on tape in Maltais format, various types of editing can be done such as replacing values that are obviously bad or removing systematic instrumental errors. After the data have been edited they are vector averaged over each recording interval to give one velocity vector per interval. These vectors are listed in terms of speed and direction. The launch and retrieval transients are truncated and any remaining bad points are deleted and replaced by linearly interpolated values. The result is an evenly spaced time series called the best basic vector averaged series which is used as input for all further processing.

To insure that each data series has a unique identifier, a set of informal guidelines has been established. For example, 2981WL900

298 - The first three digits are the mooring number.

1 - The fourth digit indicates the position of the instrument on the mooring counting from the top down.

W - When present "W" signifies a wind recorder, a "Y" would signify that the data has been read by eye.

L - Indicates that some editing has been done. The amount of editing done can usually be inferred by the position of the letter in the alphabet. If no editing has been done the symbol \$ is used.

900 - The averaging interval, 900 seconds. 1H would indicate a 1-hour averaging interval.

#### Data Presentation

Data from wind and current recording instruments are presented first, followed by a section of selected hydrostation data.

The data from each mooring follow a two-page description of that mooring. The data from each selected series are presented with 1 page of instrument information and 3 pages of data displays.

#### Mooring Summary

The first page of the mooring summary is a diagram of the mooring. The second page contains general information on the mooring. For more detailed information on the moorings set in 1969 see G. Volkmann, 1970, W.H.O.I. Ref. 70-37 (unpublished manuscript).

The mooring page uses the following:

*	data presented
M.C.M.	magnetic tape recording current meters
M.W.R.	magnetic tape recording wind recorders
Tens.	tensiometer
Tel. Tens.	telemetering tensiometer
D.R.	depth recorder
Temp.	temperature recorder
Volt. Dig.	voltage digitizer
Vib/Ten	tensiometer with accelerometer added to measure vibration
Press. Rec.	pressure recorder

### Data Summary

The first page of the data summary lists the main features of the data series collected from that instrument. The type of instrument, the sampling scheme, and the timing of the sampling are listed as are the start and stop times of the useable data. All times are Greenwich Mean Time. If the instrument did not work properly, comments on its behavior and the data quality are written under the comments section. Some standard statistical parameters are calculated for the data and are presented on the bottom of the first page. The formulas used to calculate the statistical parameters and descriptions of the various plots used to present the data on the following three pages are described below.

### Histograms

Histograms of speed are plotted. The plots may be thought of as approximations to the probability density functions. The vertical axis labeled "relative frequency per unit cell width" shows the percentage of the total record that occurred within a given interval of the horizontal axis. The area under the curve equals 100%.

### Statistics (STATS)

Standard statistical parameters are calculated for data in the time range given at the bottom of the table. If there are  $n$  speed and direction values in a sample, and we define  $E_i = s_i \sin \theta_i$ ,  $N_i = s_i \cos \theta_i$ , then for  $A = E$ ,  $N$ , and  $s$ ,

$$\text{mean, } \bar{A} = \frac{1}{n} \sum_{i=1}^n A_i$$

$$\text{variance, } \sigma_A^2 = \frac{1}{n} \sum_{i=1}^n A_i^2 - \bar{A}^2$$

$$\text{standard error of the mean} = \frac{\sigma_A}{\sqrt{n}}$$

$$\text{standard deviation} = \sigma_A$$

$$\text{skewness} = \frac{1}{\sigma^3 A} \left[ \frac{1}{n} \sum_{i=1}^n A_i^3 - \frac{3\bar{A}}{n} \sum_{i=1}^n A_i^2 + 2\bar{A}^3 \right]$$

$$\text{kurtosis} = \frac{1}{\sigma^4 A} \left[ \frac{1}{n} \sum_{i=1}^n A_i^4 - \frac{4\bar{A}}{n} \sum_{i=1}^n A_i^3 + \frac{6\bar{A}^2}{n} \sum_{i=1}^n A_i^2 - 3\bar{A}^4 \right]$$

The program also computes "East and North" statistics,

$$\text{covariance, } M = \frac{1}{n} \sum_{i=1}^n E_i N_i - \bar{E} \bar{N}$$

$$\text{standard deviation of covariance, } \sigma_m = \frac{1}{n} \sum_{i=1}^n (E_i N_i)^2 - \bar{E_i N_i}^2$$

$$\text{standard error of covariance} = \frac{\sigma_m}{\sqrt{n}}$$

$$\text{correlation coefficient, } M' = \frac{M}{\sigma_E \sigma_N}$$

STATS also computes these parameters related to vector quantities:

the scalar amplitude of the vector mean,  $v_m = \sqrt{\bar{E}^2 + \bar{N}^2}$ ; vector variance,

$$v_v^2 = \frac{1}{2} (\sigma_E^2 + \sigma_N^2); \text{ standard deviation} = v_v$$

#### East vs. North Scatterplot

The EAST and NORTH components are plotted against each other to give a pictorial indication of the DIRECTION and SPEED of the velocity vectors. This type plot can be helpful in finding instrument malfunctions and characteristics not easily noticed elsewhere.

#### Progressive Vector Diagram (PROVEC)

The EAST and NORTH progressive displacements are computed from the SPEED and DIRECTION values of one recording cycle. The plot begins with

an asterisk (\*) on a day boundary. All following day boundaries are indicated with a (+). This type of plot accentuates very low frequency events at the expense of higher frequency oscillations which may be hidden by a large amplitude low-frequency current.

#### *Variable vs. Time Plot*

This is a diagram of EAST and NORTH components plotted as a function of TIME. The plot is generated from the basic vector averaged series. This type of plot is complementary to the PROGRESSIVE VECTOR diagram since it accentuates higher frequency events such as inertial and tidal oscillations.

#### *Spectra*

The program TIMSAN (Time Series Analysis) uses the Fast Fourier Transform algorithm of Singleton (1969) and is restricted to data segments of length  $N$  points, where  $N$  must contain no prime factor larger than 5, and must be less than 8000 points; data series longer than this must be broken into two or more pieces.

The number of degrees of freedom for the first 40 plotted points is given by  $v = a m s$  where  $m$  is the number of adjacent frequency bands being averaged as stated in the label,  $s$  is the number of independent data pieces being averaged, again as stated in the label, and  $a$  should be two for temperature spectra and for Horizontal Kinetic [HKE] spectra for which the EAST and NORTH components seem statistically independent. In the absence of information regarding NORTH-EAST correlation, one should use  $a = 2$  to be safe.

The log-log plot is further averaged during plotting so that more and more points are averaged together as frequency increases. This eliminates the bunching together of points at high frequencies, increases the degrees of freedom of the high frequency estimates, and still permits low-frequency resolution. The averaging algorithm is as follows: counting from the left of the plot, the first 40 plotted points represent data that has been averaged as stated in the label; the data for the next 15 plotted points has been averaged over twice as many frequency bands;

the next 6 over five times as many, the next 40 over ten times as many, the next 15 over twenty times as many, the next 6 over fifty times as many, the next 40 over 100 times as many and so on. In this way, for example, 7900 data points with no averaging indicated in the label would be plotted as only 176 points, and the last 14 estimates would be averaged over 200 basic frequency bands. The  $m$  in the formula  $v = a m s$  for degrees of freedom is, in this example, 200 times larger at the highest frequencies than at the lowest frequencies.

For  $v > 30$ , the confidence limits for the spectral estimates are given approximately by  $(1 - 2/9v \pm 2\sqrt{2/9v})^{1/2}$ , where  $Z = 1.28375$  for 80% confidence limits,  $Z = 1.645$  for 90%,  $Z = 1.96$  for 95% and  $Z = 2.5757$  for 99%. In the example above, if the HKE spectral plot label had indicated 2 pieces and averaging over 8 adjacent frequency bands then  $v = 2 \times 2 \times 8 = 32$  for the lowest 40 frequencies (assuming NORTH and EAST components are highly correlated) and  $200 \times 32 = 6400$  for the highest frequencies. The 95% confidence intervals (i.e., 95% of the time one would expect the spectral estimates to vary no more than this much) would be (0.57, 1.55) at low frequencies, and (0.97, 1.03) at high frequencies.

For  $v \leq 30$ , one must obtain confidence intervals from Chi-Squared distribution tables in standard statistical references.

## STATION 289

1/8" TOW CABLE WITH  
POLYETHYLENE JACKET

4 FT ORE SPHERE WITH  
LIGHT AND SPHERE

1 m CHAIN  
PRESSURE RECORDER - 2891

100 m

CURRENT METER - 2892

500 m

CURRENT METER - 2893

500 m

CURRENT METER - 2894

500 m

CURRENT METER - 2895

500 m

CURRENT METER - 2896

400 m

66 m

85 m NYLON WITH 29 GLASS SPHERES  
SPACED EVENLY APART  
ACOUSTIC BEACON

10 m

ACOUSTIC RELEASE, AMF

15 m

3 m CHAIN  
2 1,500 LB STIMSON ANCHORS

Mooring No. 289

Set 69 Jan 22      38° 01.0N      04° 59.9E  
Year Month Day      Latitude      Longitude

Set by R. Heinmiller      Ship R. V. Atlantis II      Cruise 49

Retrieved 69 Mar 12  
Year Month Day

Retrieved by J. Gifford      Ship R. V. Atlantis II      Cruise 49

Purpose of Mooring: To investigate vertical distribution of inertial disturbances  
on the south side of an enclosed basin (the Mediterranean).

Mooring Type: Subsurface

<u>Data Number</u>	<u>Instrument Number</u>	<u>Type</u>	<u>Depth Meters</u>	<u>Comments</u>
2891	T-463	Press. Rec.	123	
2892*	M-209	M.C.M.	211	
2893*	M-205	M.C.M.	713	
2894*	M-206	M.C.M.	1215	
2895*	M-210	M.C.M.	1717	
2896*	M-211	M.C.M.	2219	

Water Depth      2833

COMMENTS ON MOORING:

Instrument No.: M-209Type: Magnetic tape current meterDepth: 211 mWater depth: 2833 mStart time: 69-I-23 001900Stop time: 69-III-12 101900Duration: 48d 10hSampling scheme: Interval

time between strobes = 5 seconds

no. of strobes per interval = 24

interval time = 900 seconds

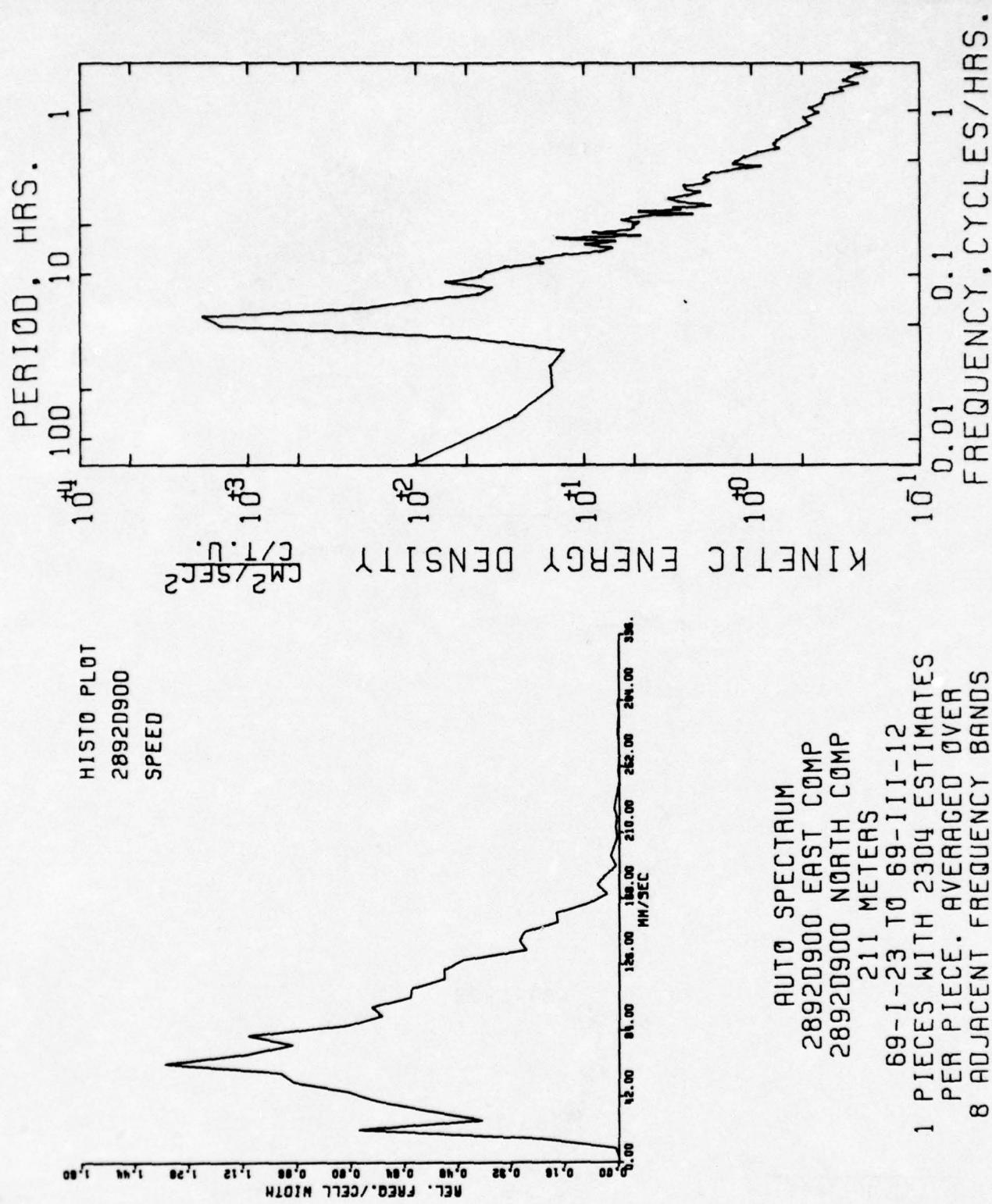
**COMMENTS:**

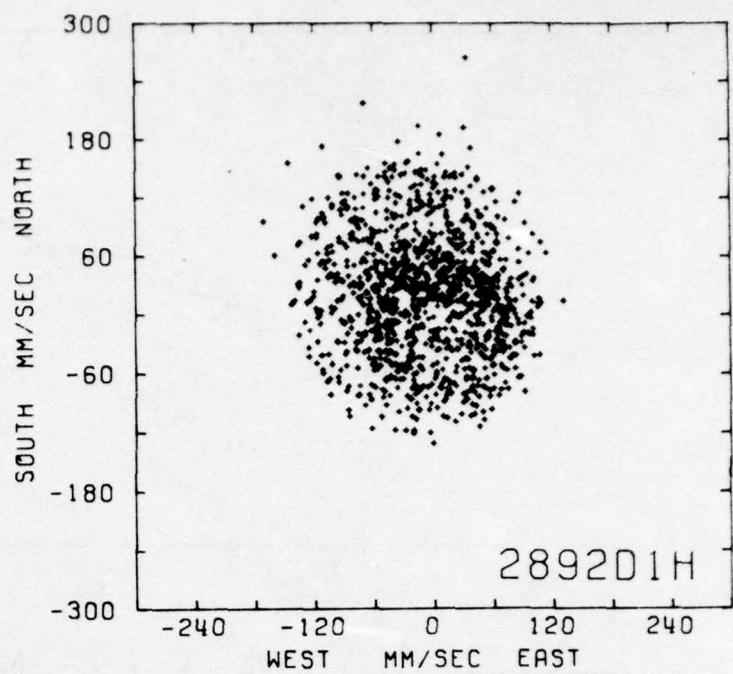
The clock information on this data file was extensively edited by Dr. H. Perkins for his thesis. The data presented here have had bad data values removed but not the Perkins time adjustment. Time difference is less than two hours.

**STATS**

MEAN	=	-8.95	EAST	20.71	NORTH	78.66	=	COVARIANCE	EAST	4	NORTH	=	WWWWW
STD. ERR.	=	.83		.92		.56	=	STD. ERR. OF COVARIANCE				=	-322.93
VARIANCE	=	3164.81		3963.43		1448.73	=	STD. DEV. OF COVARIANCE				=	52.73
STD. DEV.	=	56.26		62.96		38.08	=	CORRELATION COEFFICIENT				=	3585.48
KURTOSIS	=	2.42		2.81		3.81	=	VECTOR MEAN				=	-.081
SKEWNESS	=	-.15		.18		.88	=	VECTOR VARIANCE				=	22.58
							=	STD. DEV.				=	3584.17
												=	59.70

**DATA/ 28920900****UNITS OF RAW DATA VARIABLES = MM/SEC****SAMPLE SIZE = 4649 POINTS****SPANNING RANGE**FROM 69- I -23 00.19.00  
TO 69- III-12 10.19.00**DURATION 48 DAYS 10 H 0 M 0 S**





69-III-01

28

69-I-23

21

69-II-02

16 6

10

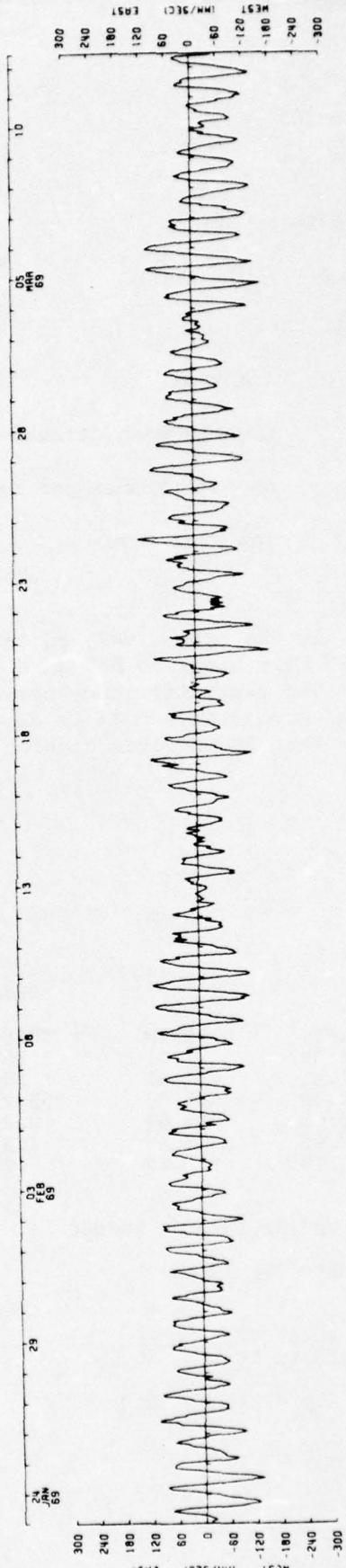
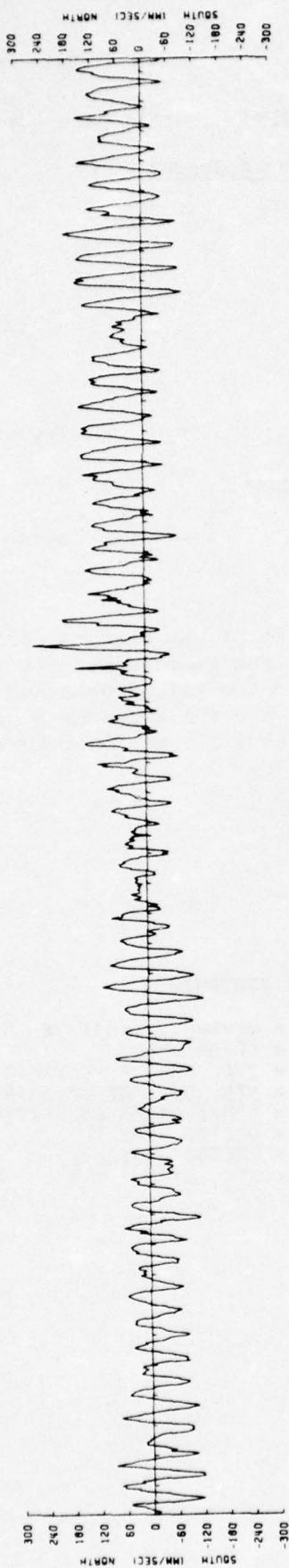


0. 20.  
KILOMETERS

2892D1H

211 M

69- I -23 TO 69- III-12



Instrument No.: M-205Type: Magnetic tape current meterDepth: 713 mWater depth: 2833 mStart time: 69-I-22 225800Stop time: 69-III-03 174300Duration: 39d 18h 45mSampling scheme: Interval

time between strobes = 5 seconds

no. of strobes per interval = 24

interval time = 900 seconds

**COMMENTS:**

This data file was extensively edited by Dr. H. Perkins for his thesis. The data presented here have had bad data values removed but not the Perkins time adjustment. The time difference between the edited data and the collected data is about 8 days. It is as if the collected data had sampled at a rate greater than 900 seconds causing fewer records therefore less time.

**STATS****DATA/ 28930900**

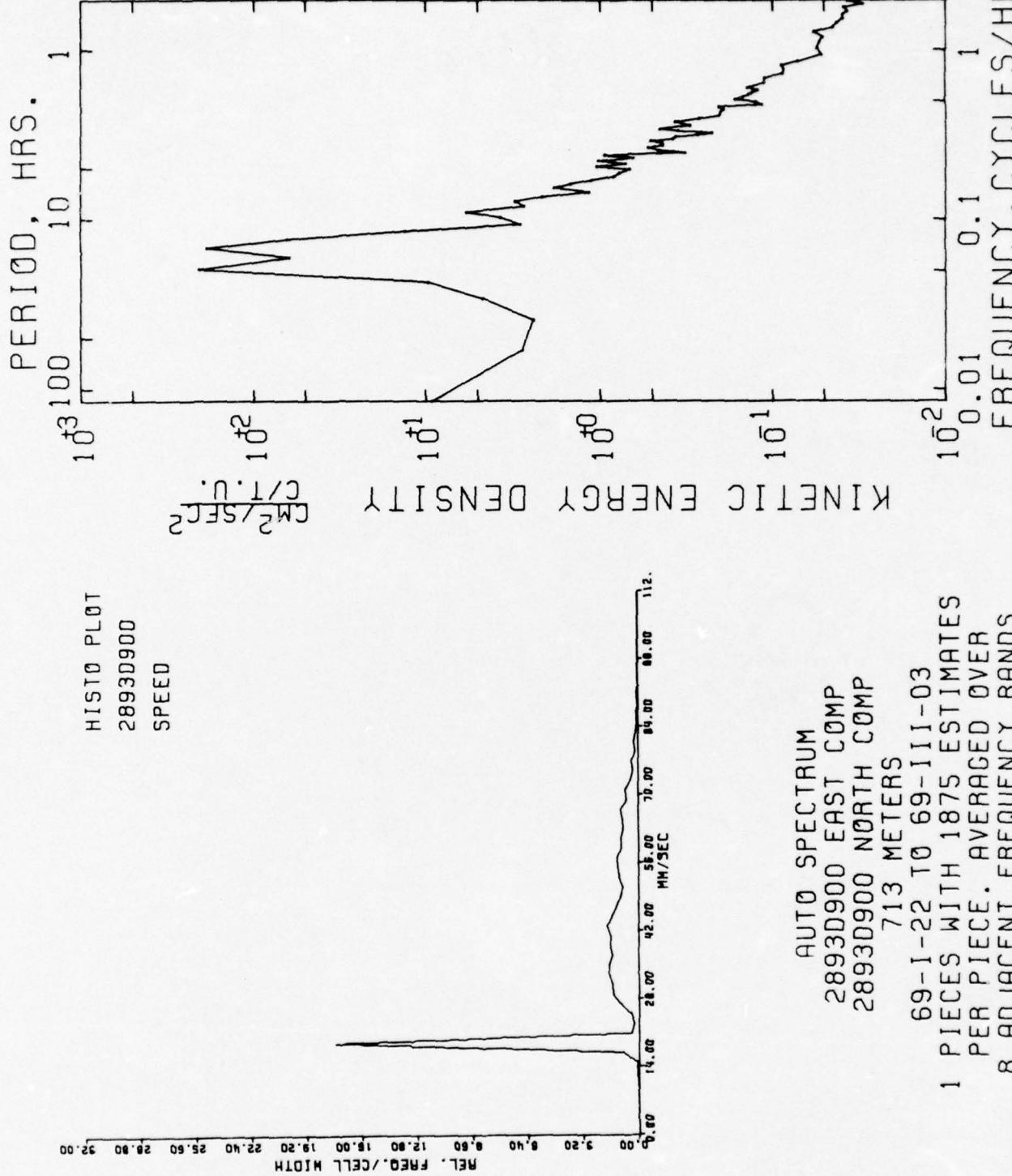
MEAN	EAST	NORTH	SPEED	EAST & NORTH	WWWWWW
STD. ERR.	-14.79	-7.01	35.87	COVARIANCE	= -117.12
VARIANCE	.43	.41	.30	STD. ERR. OF COVARIANCE	= 12.78
STD. DEV.	710.46	648.86	393.27	STD. DEV. OF COVARIANCE	= 780.61
KURTOSIS	26.85	25.47	16.26	CORRELATION COEFFICIENT	= -.172
SKEWNESS	2.85	3.27	2.31	VECTOR MEAN	= 16.37
	.19	-.20	.85	VECTOR VARIANCE	= 879.66
				STD. DEV.	= 26.07

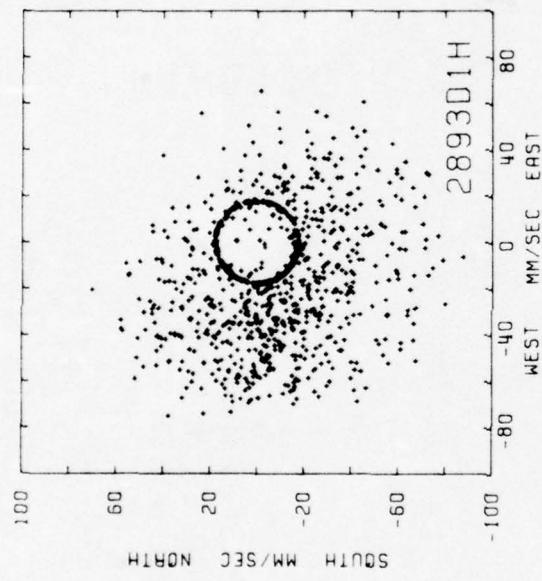
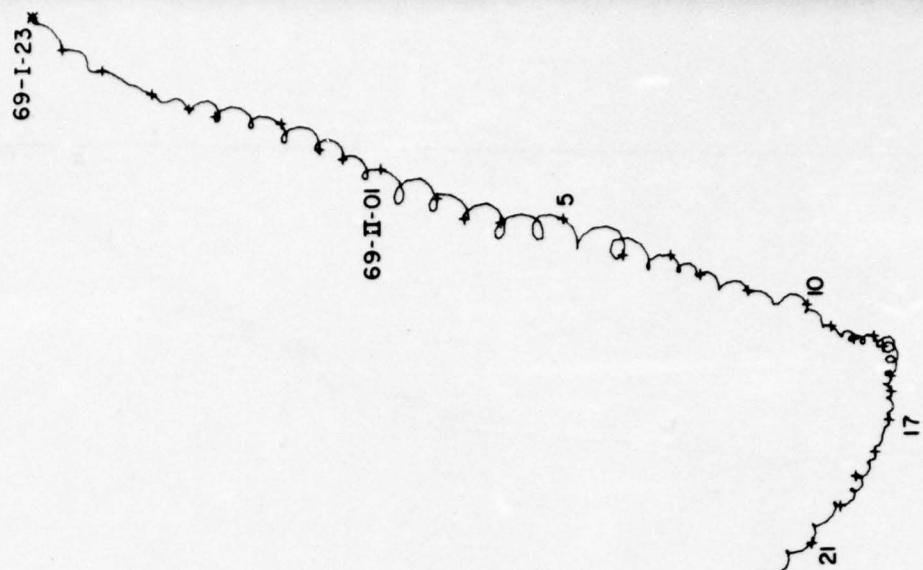
UNITS OF RAW DATA VARIABLES = MM/SEC

SAMPLE SIZE = 3820 POINTS

SPANNING RANGE  
 FROM 69- I -22 22.58.00  
 TO 69- III-03 17.43.00

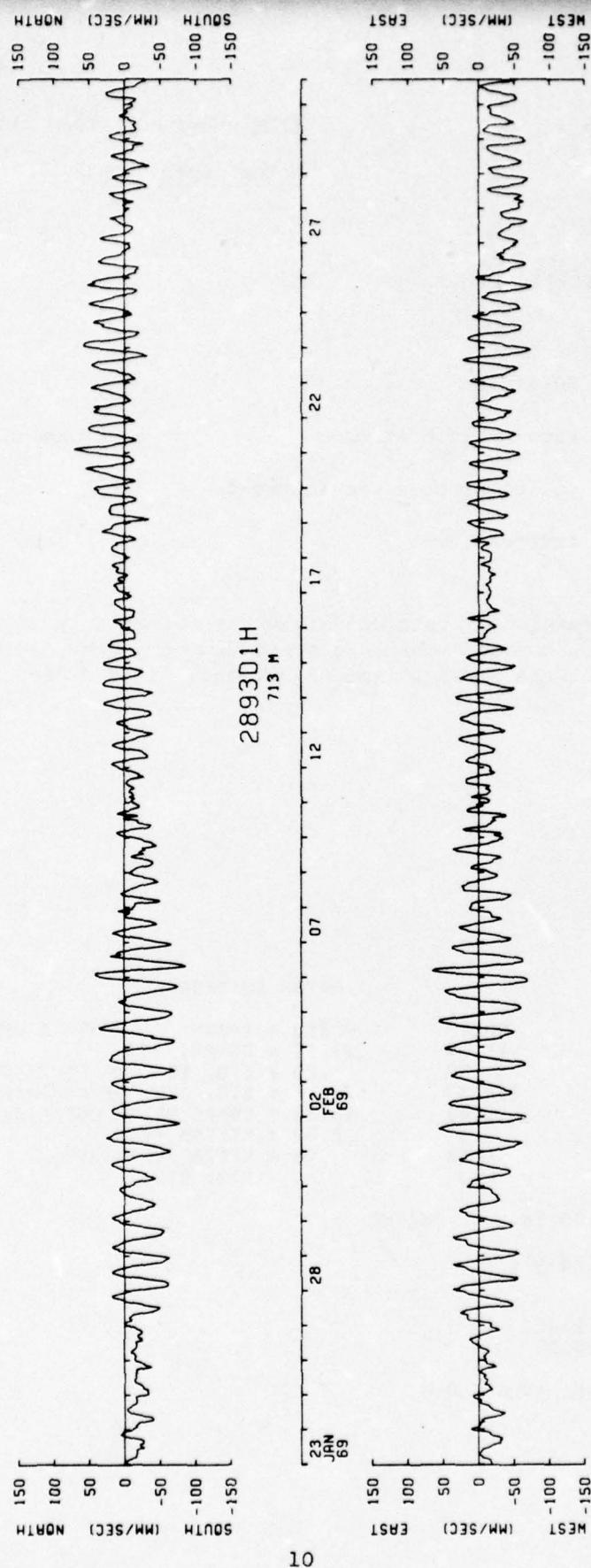
DURATION 39 DAYS 18 H 45 M 0 S





N ↑

0.  KILOMETERS  
289301H  
713 M  
69- 1 -23 TO 69- 111-03



Data number 2894

Instrument No.: M-206

Type: Magnetic tape current meter

Depth: 1215 m

Water depth: 2833 m

Start time: 69-I-22 232500

Stop time: 69-III-11 122500

Duration: 47d 13h

Sampling scheme: Interval

time between strobes = 5 seconds

no. of strobes per interval = 24

interval time = 900 seconds

COMMENTS:

The clock information on this data file was extensively edited by Dr. H. Perkins for his thesis. The data presented here have had bad data values removed but not the Perkins time adjustment. Time difference is less than two hours.

STATS

	EAST	NORTH
MEAN	-13.61	-11.26
STD. ERR.	.31	.29
VARIANCE	445.70	393.37
STD. DEV.	21.11	18.03
KURTOSIS	2.69	2.81
SKEWNESS	.04	-.08

DATA/ 2894F900

	EAST & NORTH	
SPEED	31.17	MM/MM
COVARIANCE	.20	MM/MM
STD. ERR. OF COVARIANCE	178.16	MM/MM
STD. DEV. OF COVARIANCE	13.39	MM/MM
CORRELATION COEFFICIENT	2.69	MM/MM
VECTOR MEAN	.78	MM/MM
VECTOR VARIANCE	419.54	MM/MM
STD. DEV.	20.48	MM/MM

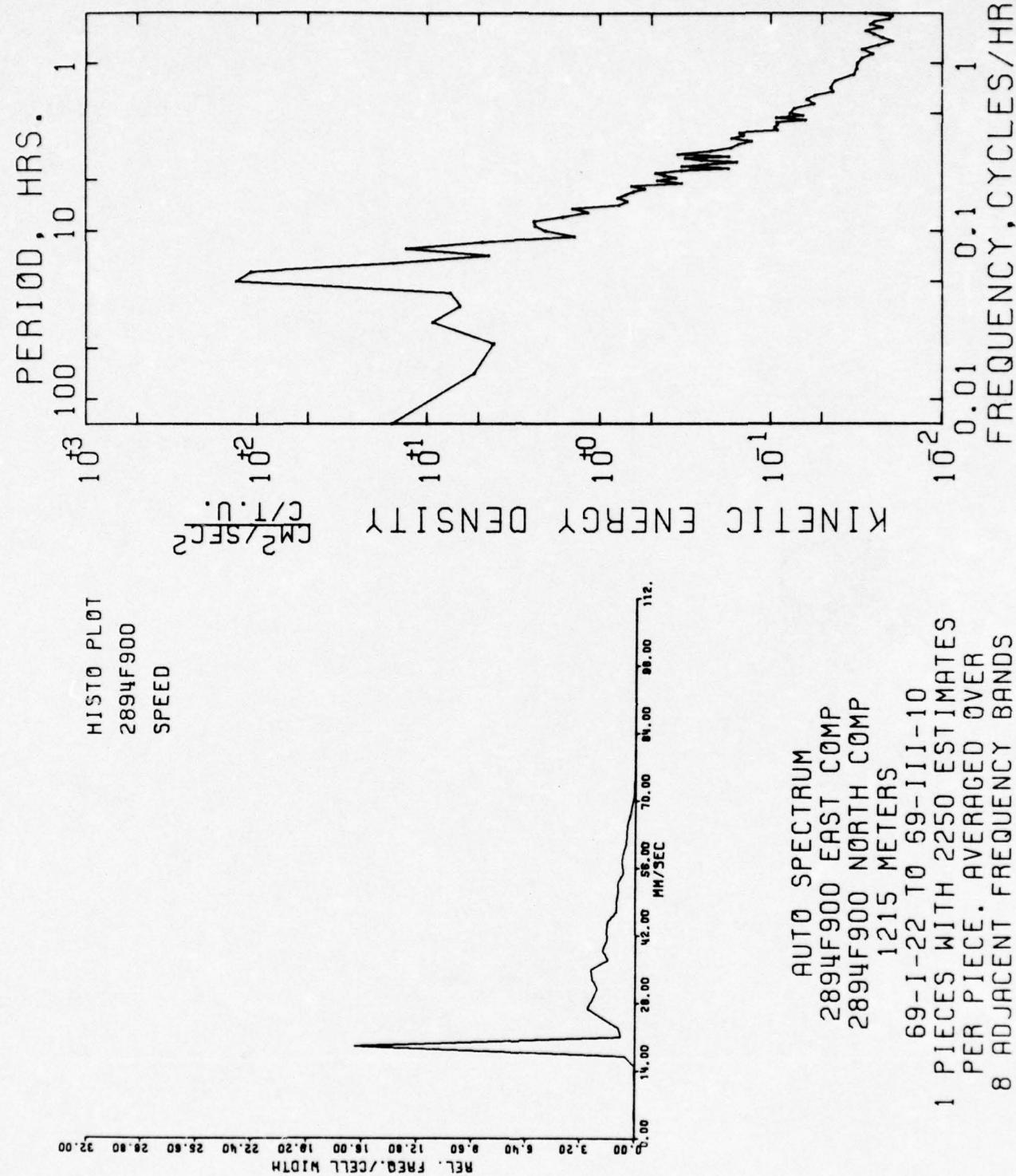
UNITS OF RAW DATA VARIABLES = MM/SEC

SAMPLE SIZE = 4565 POINTS

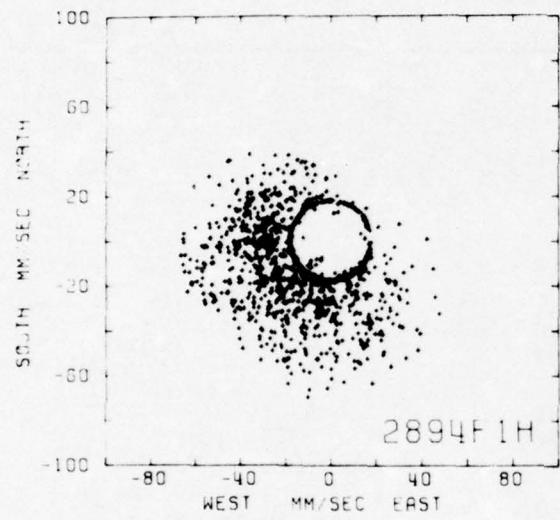
SPANNING RANGE

FROM 69- I -22 23.25.00  
TO 69- III-11 12.25.00

DURATION 47 DAYS 13 H 0 M 0 S



12



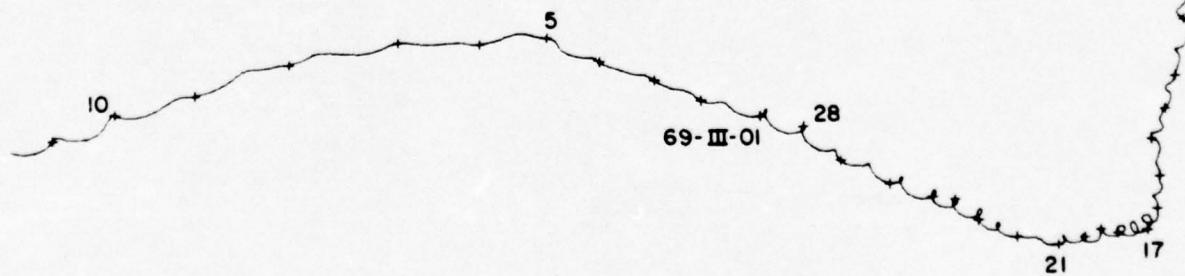
69-I-23

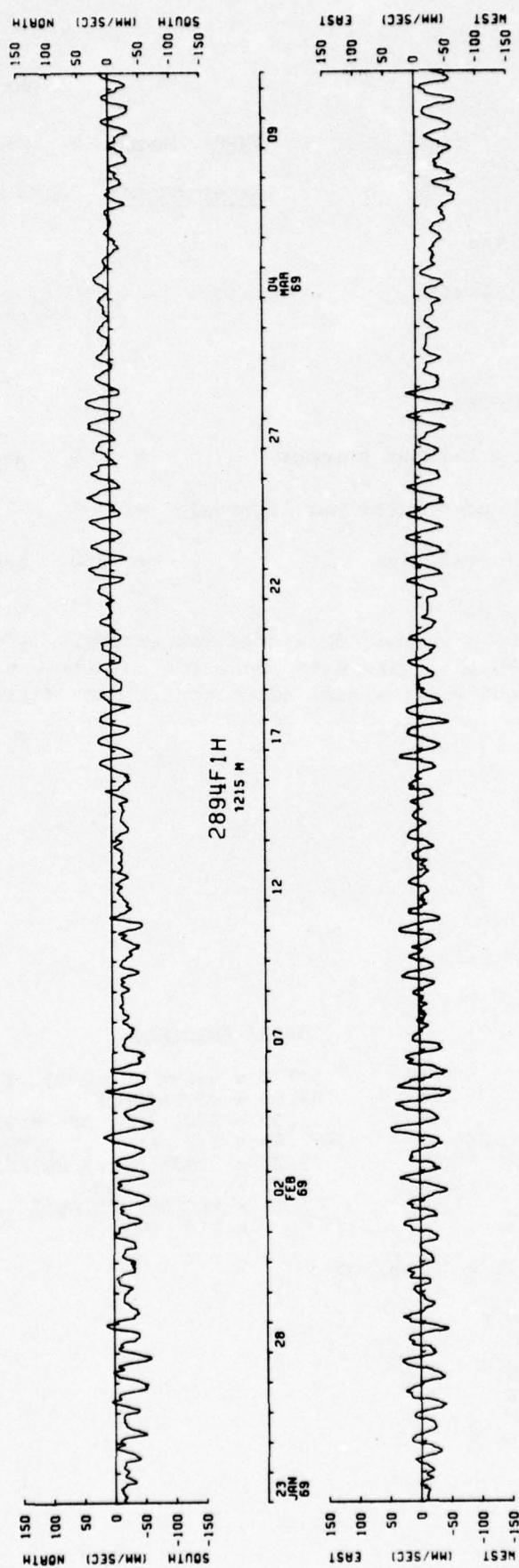
N  
↑

0. — 10.  
KILOMETERS

2894F1H  
1215 M  
69- 1 -23 TO 69- III-11

69-II-01





Instrument No.: M-210Type: Magnetic tape current meterDepth: 1717 mWater depth: 2833 mStart time: 69-I-23 001435Stop time: 69-III-12 101435Duration: 48d 10hSampling scheme: Interval

time between strobes	=	5	seconds
no. of strobes per interval	=	24	
interval time	=	900	seconds

**COMMENTS:**

The clock information on this data file was extensively edited by Dr. H. Perkins for his thesis. The data presented here have had bad data values removed but not the Perkins time adjustment. Time difference is less than two hours.

**STATS**

MEAN	EAST	NORTH
STD. ERR.	-15.86	-7.96
VARIANCE	.44	.42
STD. DEV.	808.35	825.12
KURTOSIS	30.16	28.72
SKEWNESS	3.59	3.94
	.56	-1.00

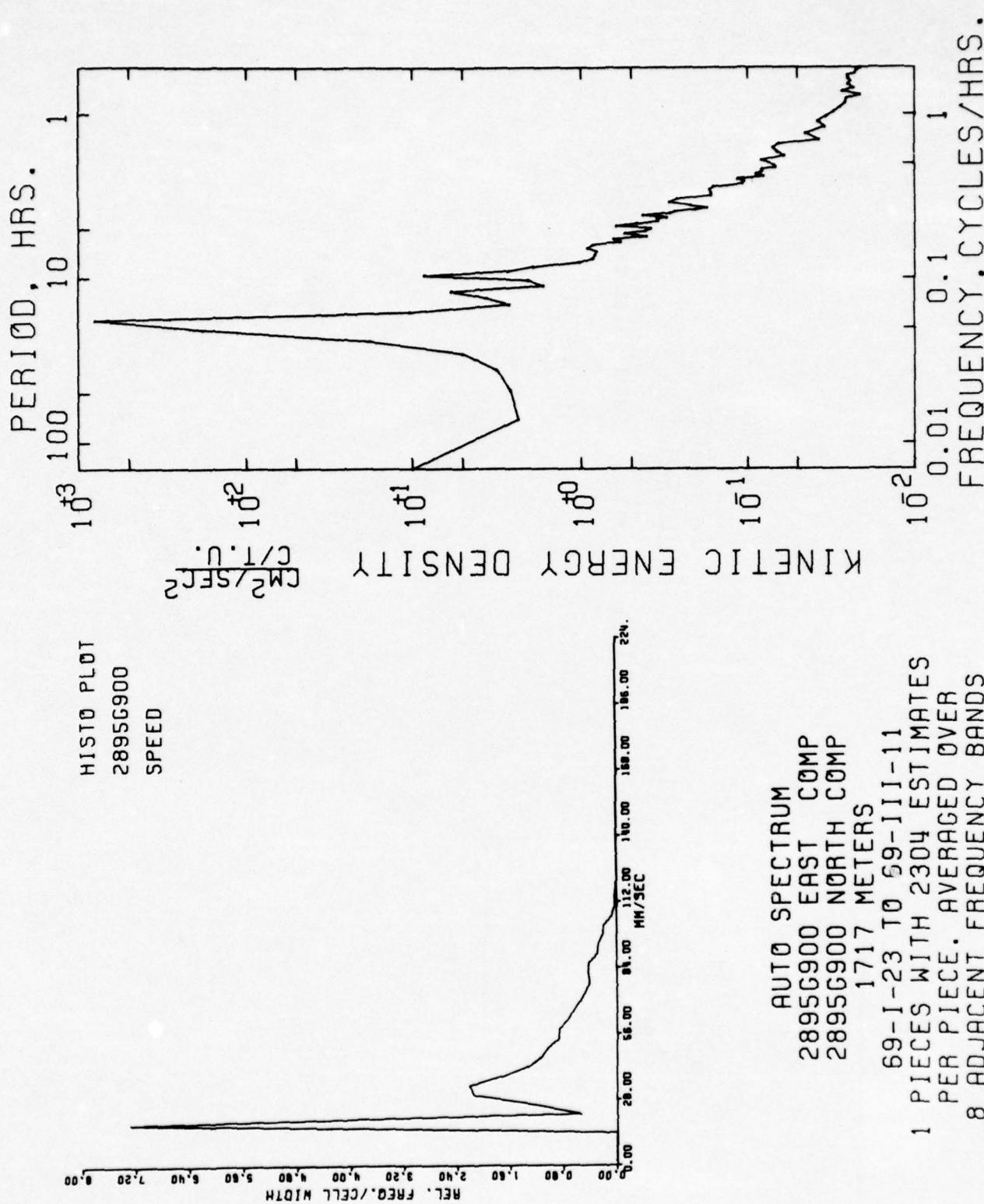
**DATA/ 28956900**

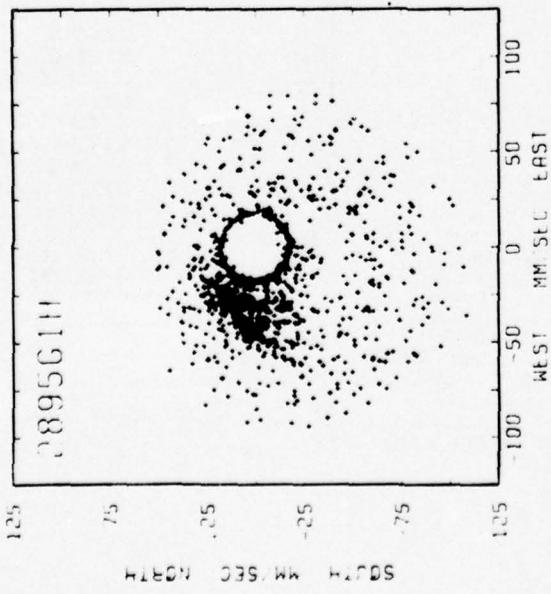
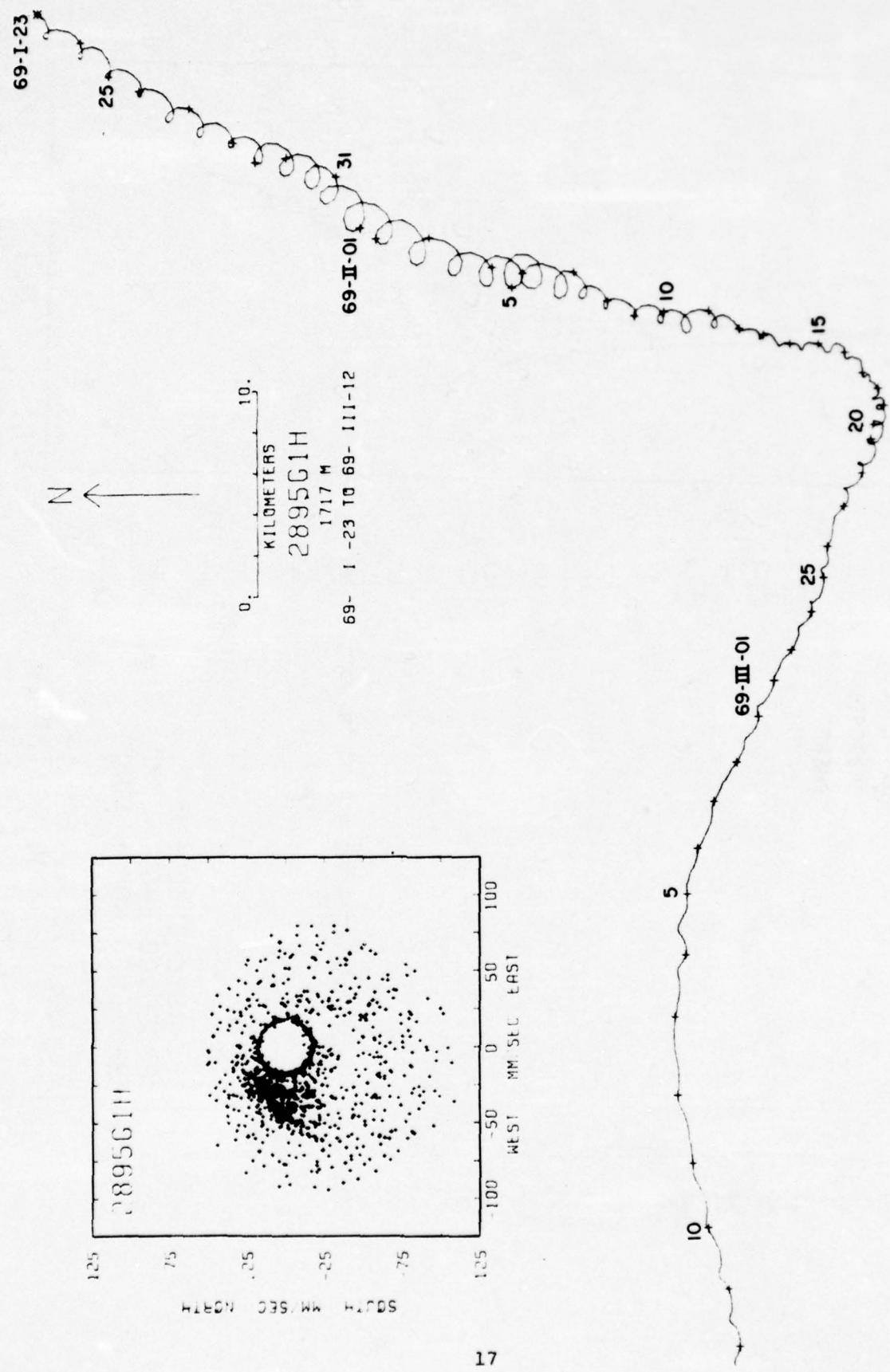
SPEED	NNNNN	EAST & NORTH	NNNNN
39.55	COVARIANCE	-61.31	
.32	STD. ERR. OF COVARIANCE	15.82	
484.96	STD. DEV. OF COVARIANCE	1085.18	
22.02	CORRELATION COEFFICIENT	-.071	
3.24	VECTOR MEAN	17.73	
1.01	VECTOR VARIANCE	867.29	
	STD. DEV.	29.45	

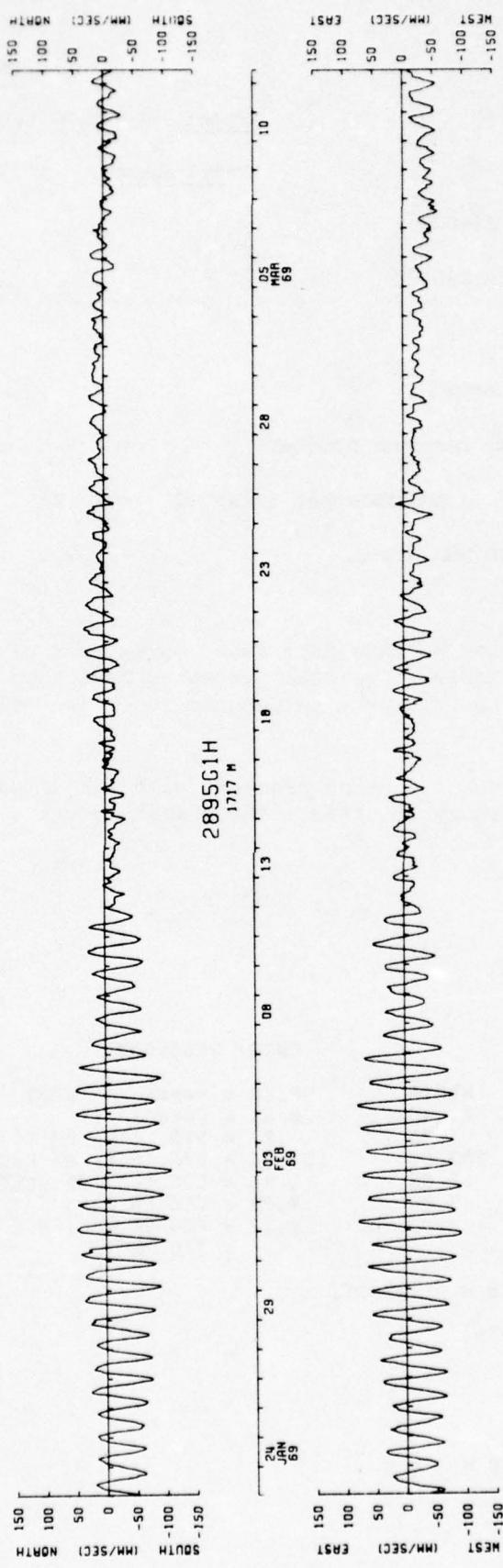
**UNITS OF RAW DATA VARIABLES = MM/SEC****SAMPLE SIZE = 4649 POINTS**

**SPANNING RANGE**  
 FROM 69- I -23 00.14.35  
 TO 69- III-12 10.14.35

**DURATION 48 DAYS 10 H 0 M 0 S**







Instrument No.: M-211Type: Magnetic tape current meterDepth: 2219 mWater depth: 2833 mStart time: 69-I-22 224800Stop time: 69-II-22 090300Duration: 30d 10h 15mSampling scheme: Interval

time between strobes = 5 seconds

no. of strobes per interval = 24

interval time = 900 seconds

**COMMENTS:**

The clock information on this data file was extensively edited by Dr. H. Perkins for his thesis. The data presented here have had bad data values removed but not the Perkins time adjustment. Time difference is less than two hours.

Compass assembly leaked causing problems with the compass values. Vane follower sticks February 20, 1969. The quality of this data file is very poor.

**STATS****DATA/ 2896E900**

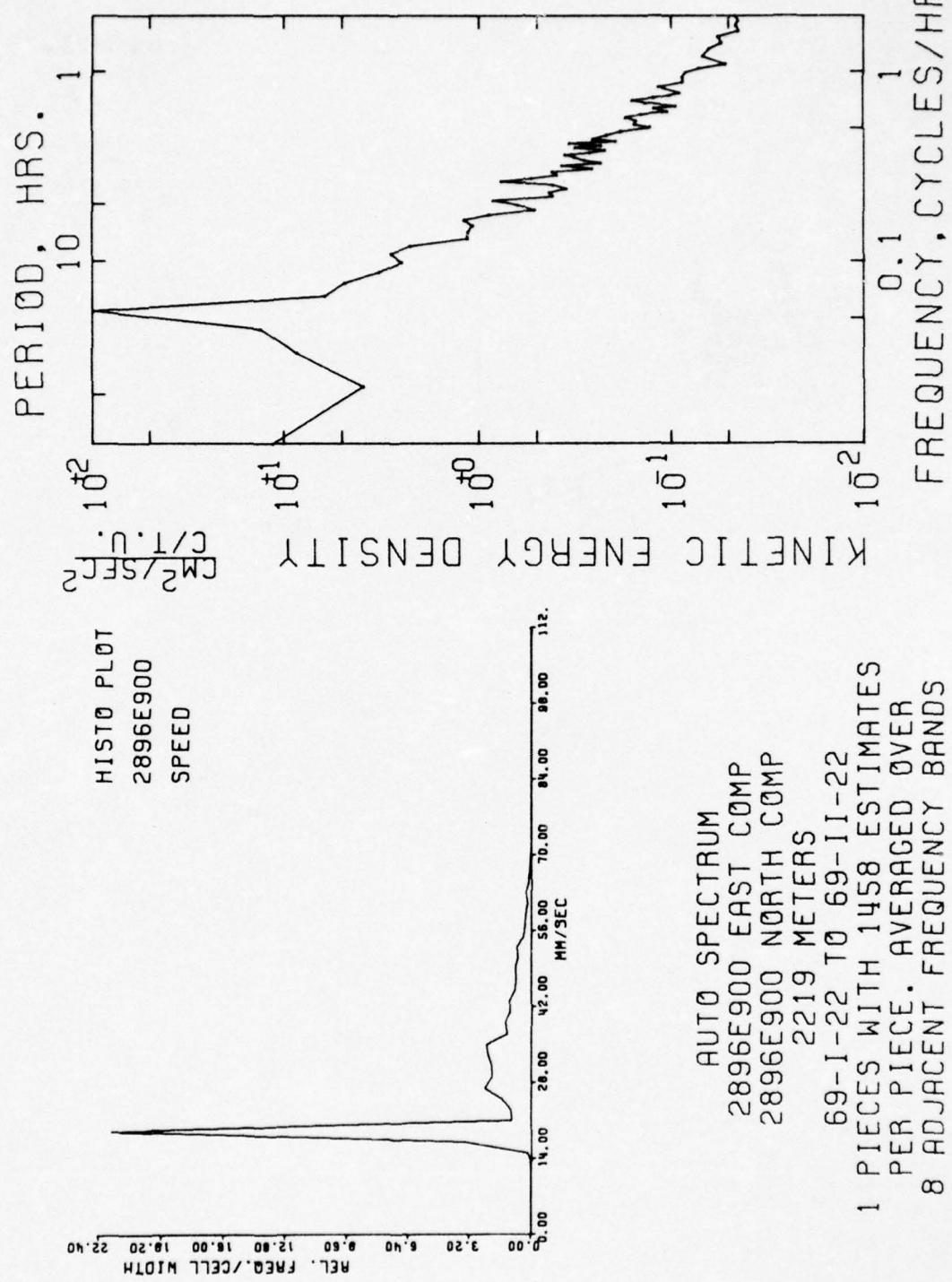
MEAN	=	EAST	-6.68	NORTH	-17.48	SPEED	=	55555	EAST & NORTH	=	55555
STD. ERR.	=	.30	.28	.21	.28	COVARIANCE	=	-8.92	COVARIANCE	=	7.28
VARIANCE	=	255.59	232.68	131.32	131.32	STD. ERR. OF COVARIANCE	=	394.24	STD. DEV. OF COVARIANCE	=	-.037
STD. DEV.	=	15.88	15.25	11.46	11.46	CORRELATION COEFFICIENT	=	18.71	VECTOR MEAN	=	244.19
KURTOSIS	=	3.17	3.01	3.64	3.64	VECTOR VARIANCE	=	15.62	STD. DEV.	=	55555
SKEWNESS	=	-.01	-.08	1.22	1.22	STD. DEV.	=			=	

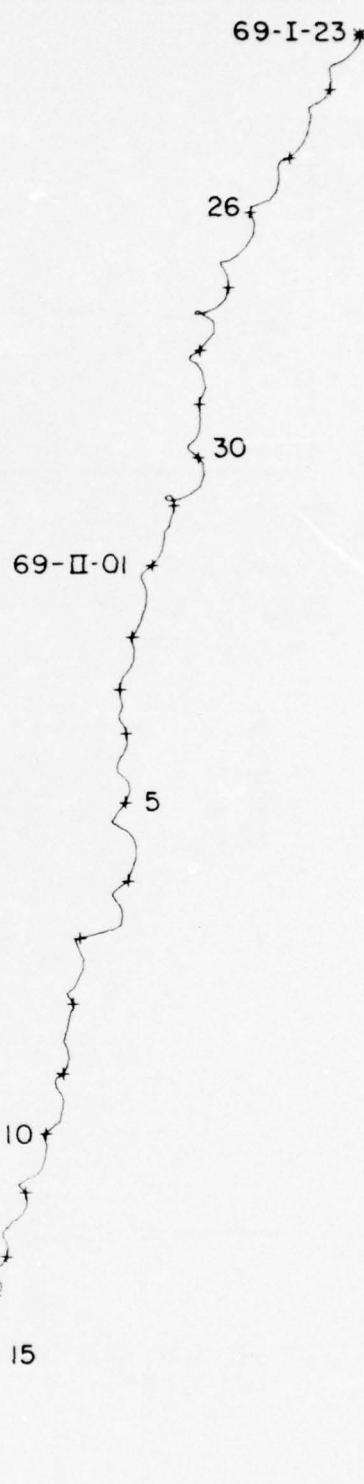
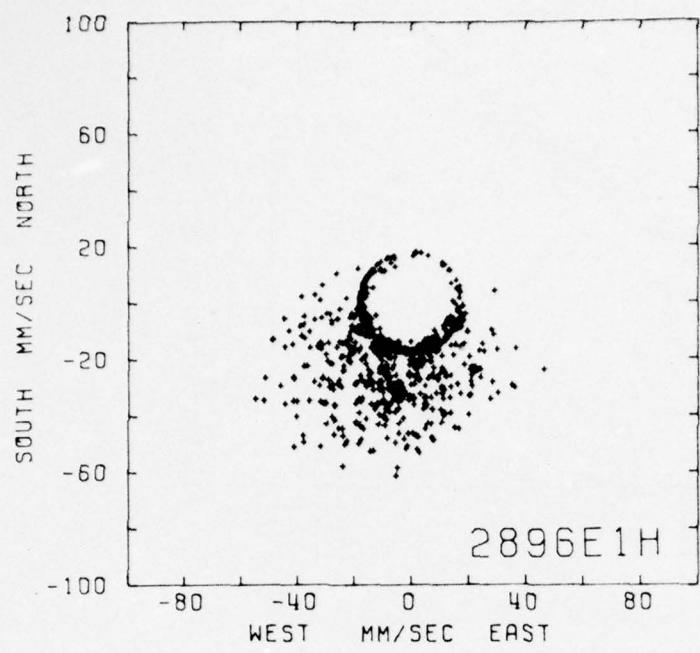
UNITS OF RAW DATA VARIABLES = MM/SEC

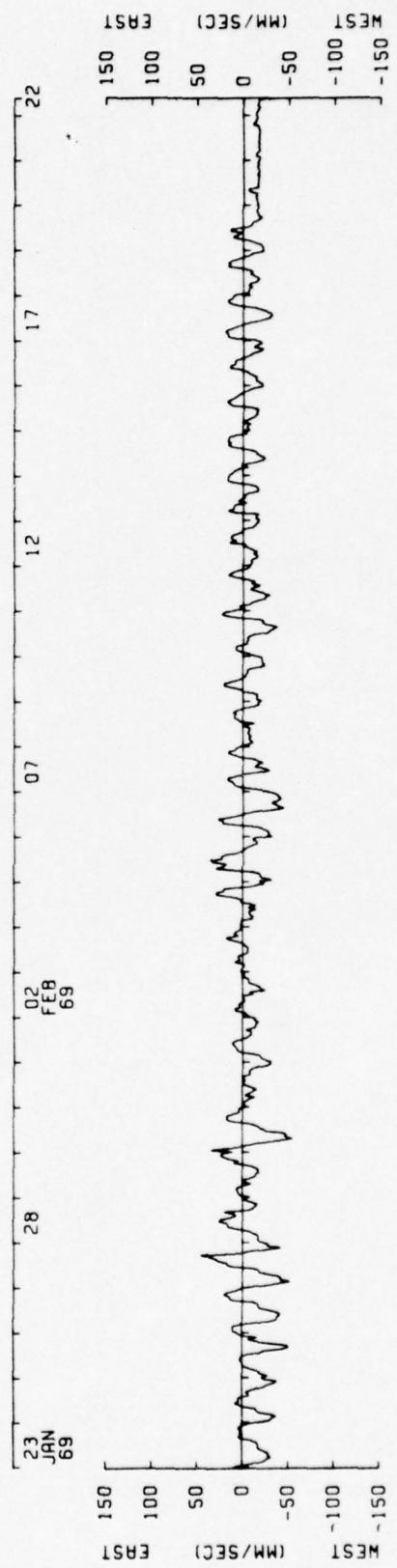
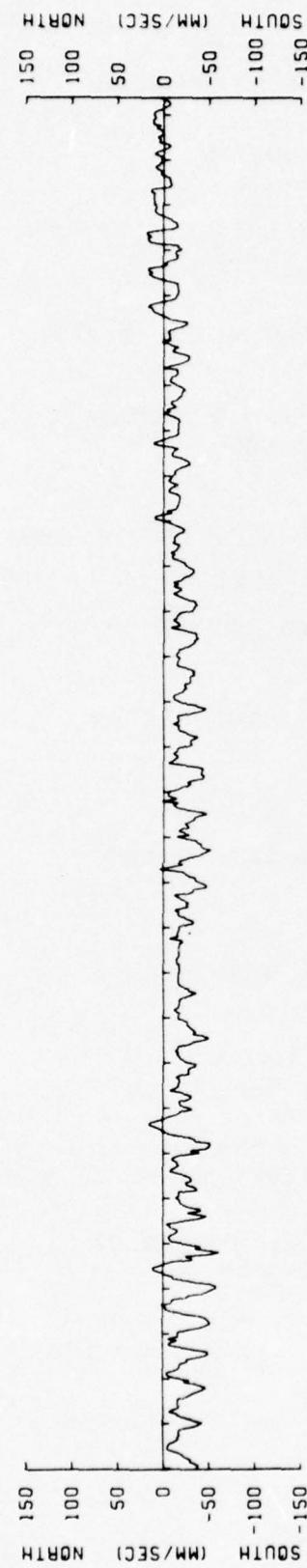
SAMPLE SIZE = 2922 POINTS

**SPANNING RANGE**FROM 69- I -22 22.48.00  
TO 69- II -22 09.09.00

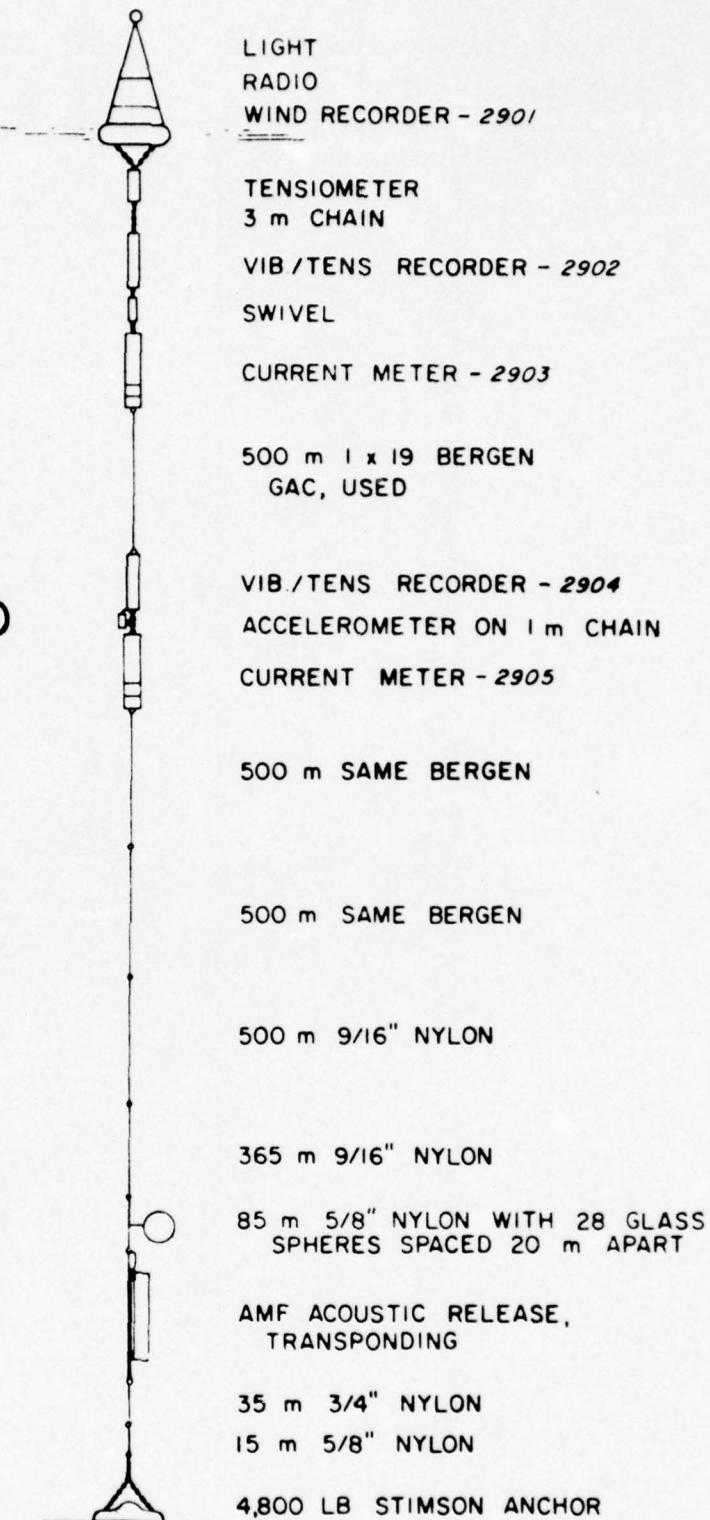
DURATION 30 DAYS 10 H 15 M 0 S







STATION 290



Mooring No. 290

Set 69 Apr 16  
Year Month Day

39° 10.9N  
Latitude

70° 02.5W  
Longitude

Set by R. Heinmiller

Ship R. V. Chain

Cruise 90

Retrieved 69 Apr 24  
Year Month Day

Retrieved by R. Heinmiller

Ship R. V. Chain

Cruise 90

Purpose of Mooring: 1) Launch transient and mooring dynamics measurements.  
2) Part of acoustic net with 291 and 293.

Mooring Type: Surface

<u>Data Number</u>	<u>Instrument Number</u>	<u>Type</u>	<u>Depth Meters</u>	<u>Comments</u>
2901	W-101X	M.W.R.	-0-	
2902	Ser. 2	Vib/Ten	10	
2903*	M-151	M.C.M.	16	
2904	Ser. 1	Vib/Ten	518	
2905*	M-198	M.C.M.	521	Rotor out of its bearings at recovery

Water Depth 2682

#### Hydrographic Stations

R. V. Chain cruise 90 Station 872

R. V. Chain cruise 90 Station 873

R. V. Chain cruise 90 Station 878

#### COMMENTS ON MOORING:

Canadian vessel "Jean Frances" reported fouling her longlines in mooring on April 23, 1969.

Instrument No.: M-151Type: Magnetic tape current meterDepth: 16 mWater depth: 2682 mStart time: 69-IV-16 115712Stop time: 69-IV-24 160712Duration: 8d 4h 10mSampling scheme: Continuous

one reading every 5 seconds

COMMENTS:

## STATS

	EAST	NORTH
MEAN	442.02	197.92
STD. ERR.	5.52	4.27
VARIANCE	71802.46	42852.15
STD. DEV.	267.86	207.25
KURTOSIS	2.09	3.13
SKEWNESS	-.12	.57

## DATA/ 2903A300

	EAST	NORTH	
SPEED	520.40	5.77	COVARIANCE
	78483.55	280.17	STD. ERR. OF COVARIANCE
			STD. DEV. OF COVARIANCE
			CORRELATION COEFFICIENT
			VECTOR MEAN
			VECTOR VARIANCE
			STD. DEV.

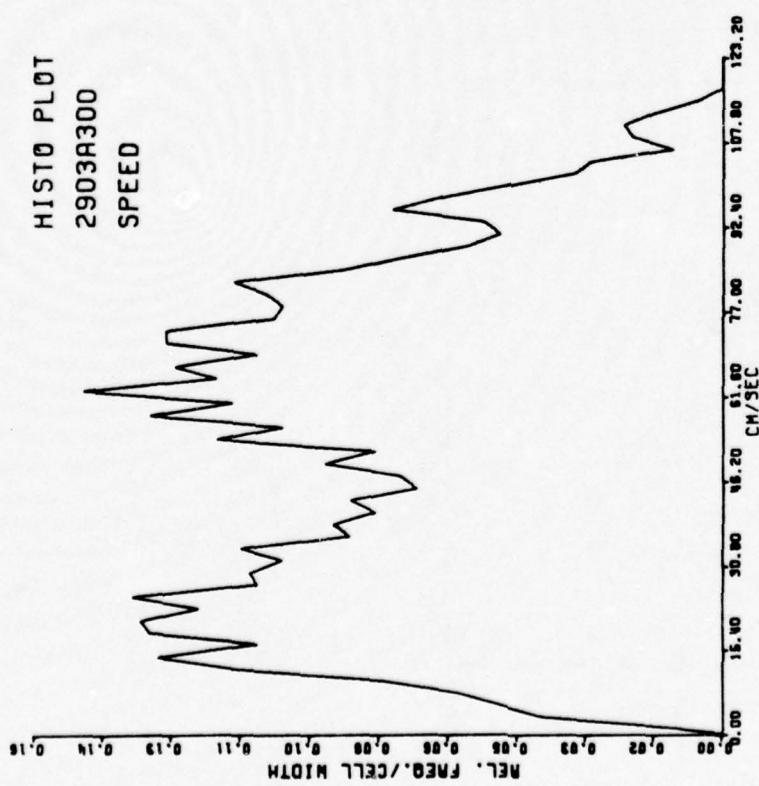
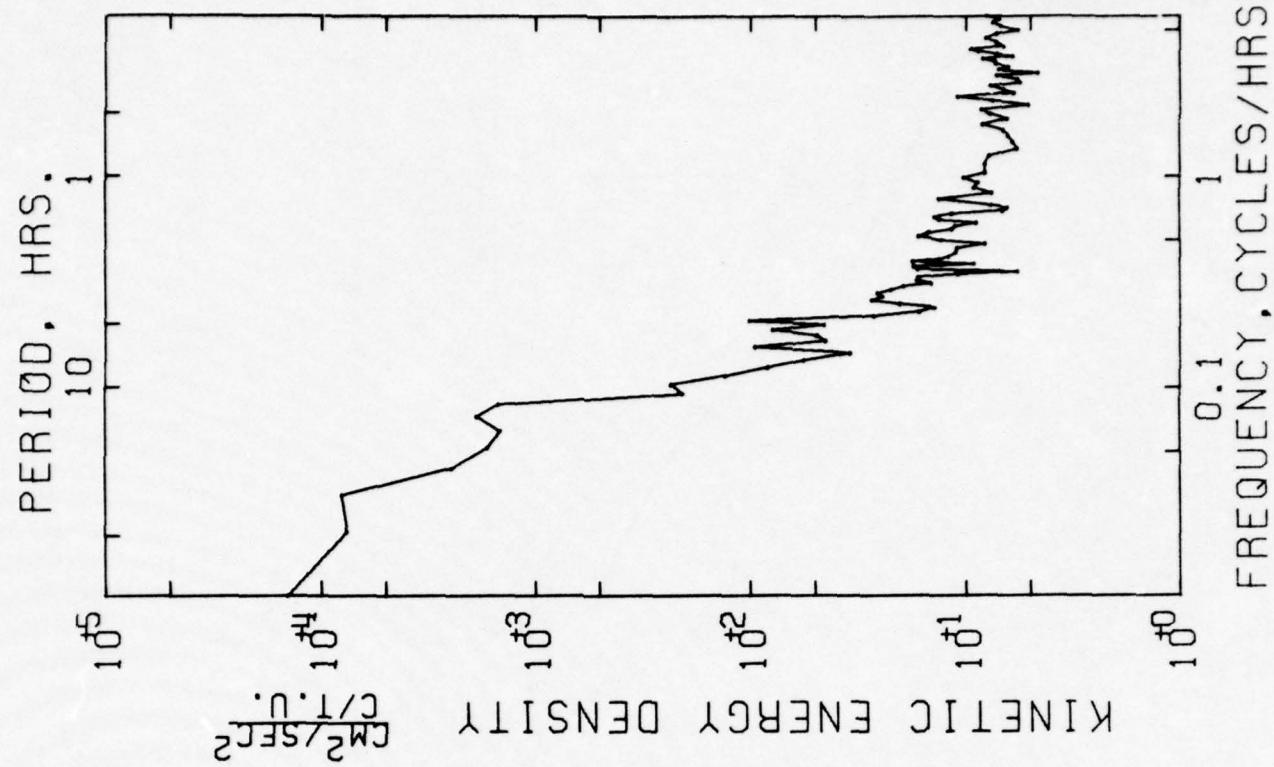
UNITS OF RAW DATA VARIABLES = MM/SEC

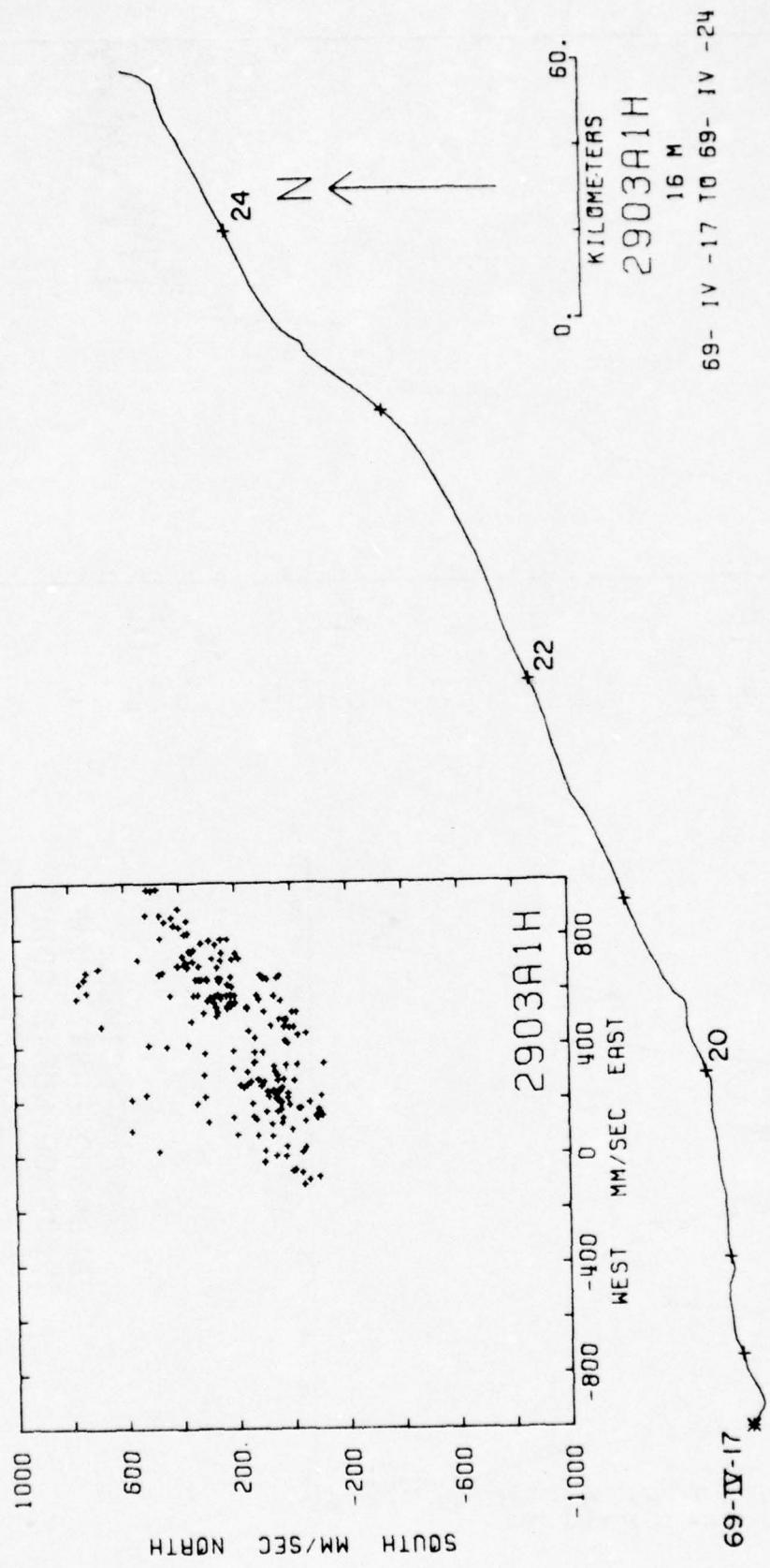
SAMPLE SIZE = 2355 POINTS

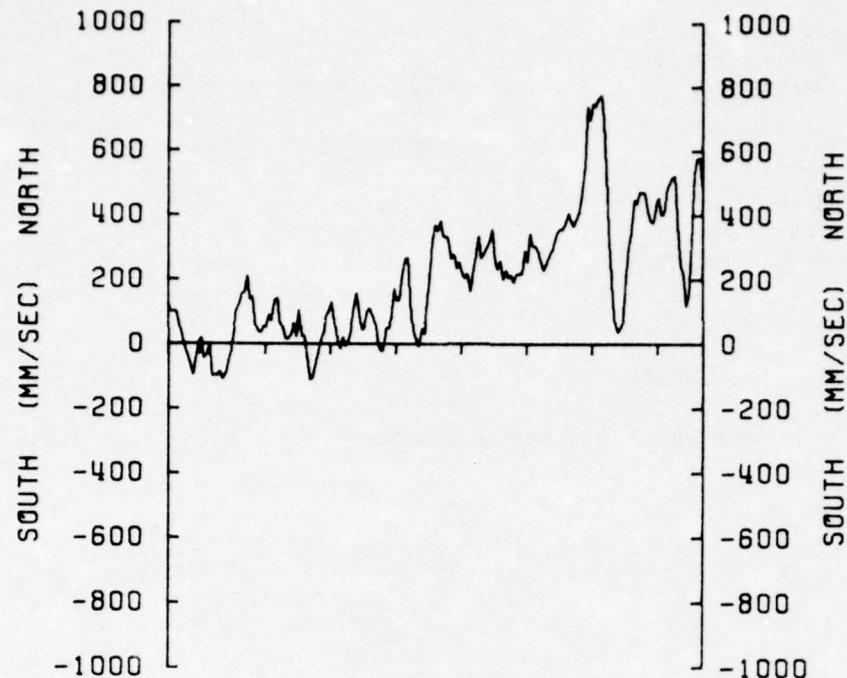
## SPANNING RANGE

FROM 69- IV -16 11.57.12  
TO 69- IV -24 16.07.12

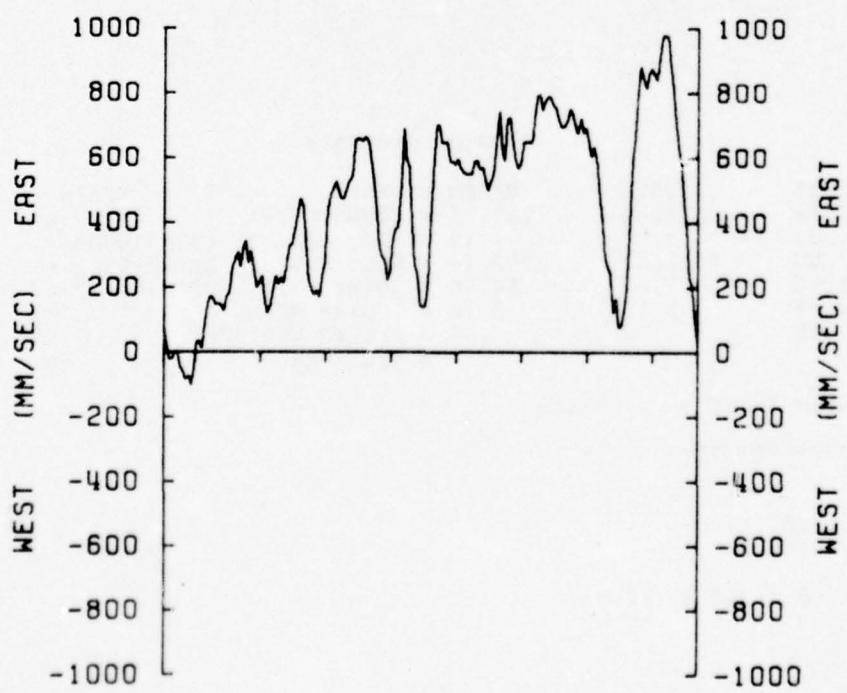
DURATION 8 DAYS 4 H 10 M 0 S







17  
APR  
69



Data number 2905

Instrument No.: M-198

Type: Magnetic tape current meter

Depth: 521 m

Water depth: 2682 m

Start time: 69-IV-16 130022

Stop time: 69-IV-24 154022

Duration: 8d 2h 40m

Sampling scheme: Continuous

one reading every 5 seconds

COMMENTS:

STATS

	EAST	NORTH
MEAN	80.89	73.84
STD. ERR.	.96	1.48
VARIANCE	2132.48	5118.27
STD. DEV.	48.18	71.55
KURTOSIS	2.93	3.30
SKEWNESS	.05	-.02

DATA/ 2905\$300

	EAST & NORTH	WWWWWW
SPEED	127.71	COVARIANCE
	1.13	STD. ERR. OF COVARIANCE
	2869.18	STD. DEV. OF COVARIANCE
	54.48	CORRELATION COEFFICIENT
	2.78	VECTOR MEAN
	.53	VECTOR VARIANCE
		* STD. DEV.

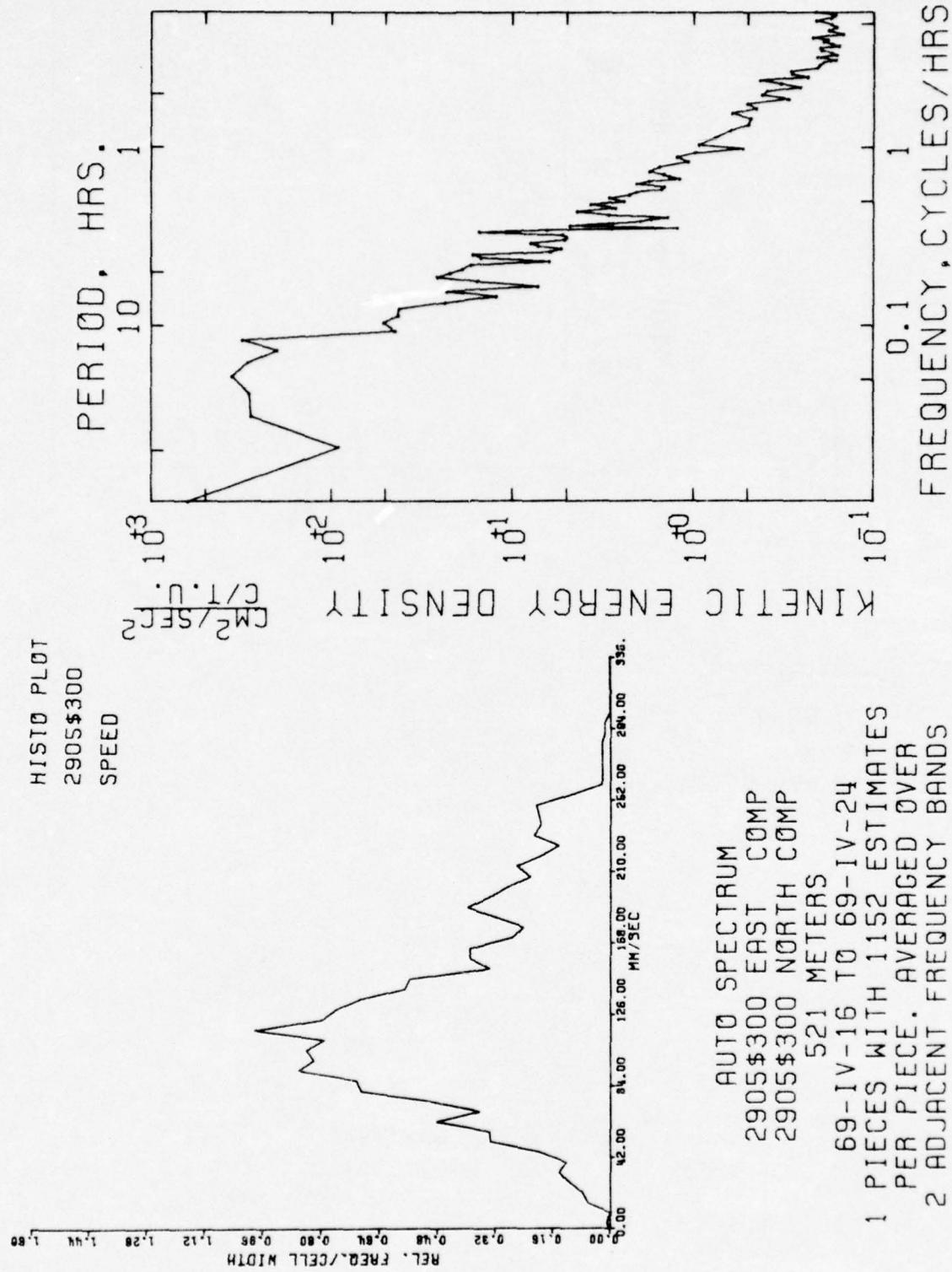
UNITS OF RAW DATA VARIABLES = MM/SEC

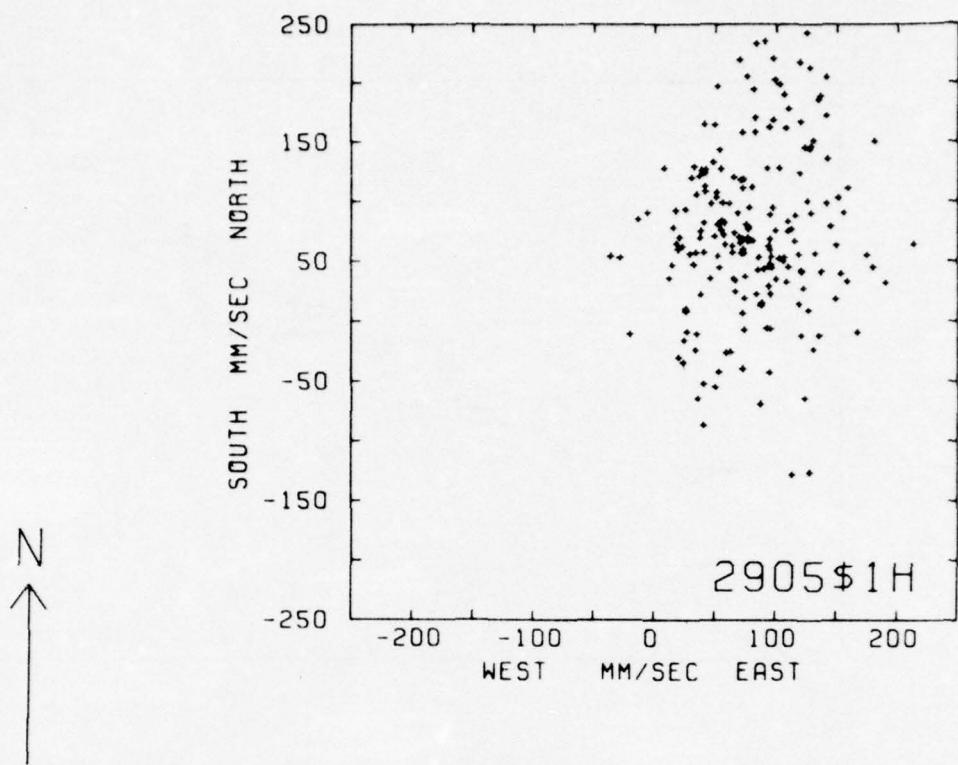
SAMPLE SIZE = 2337 POINTS

SPANNING RANGE

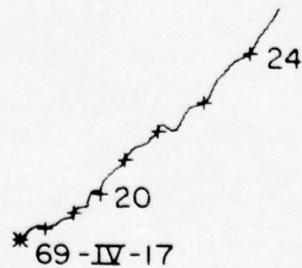
FROM 69- IV -16 13.00.22  
TO 69- IV -24 15.40.22

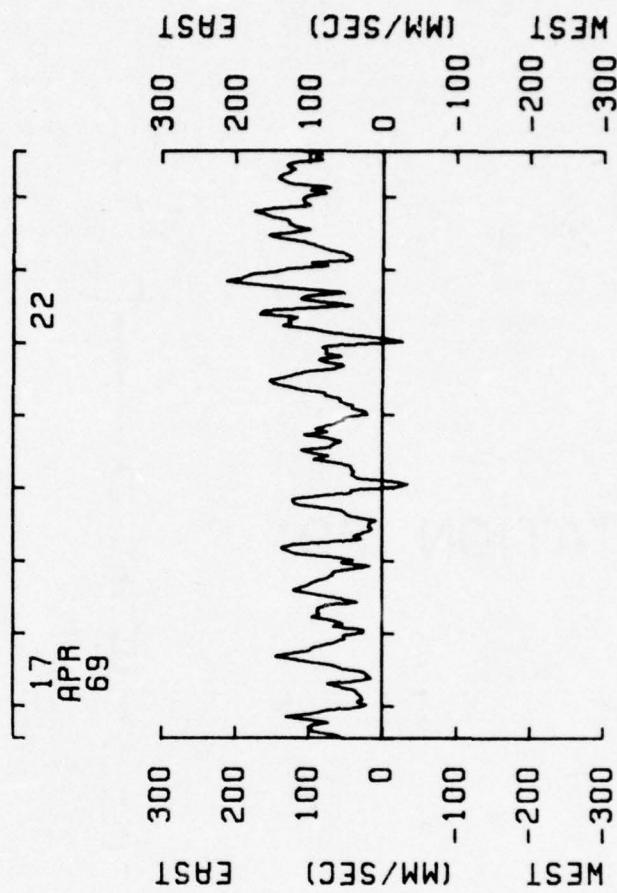
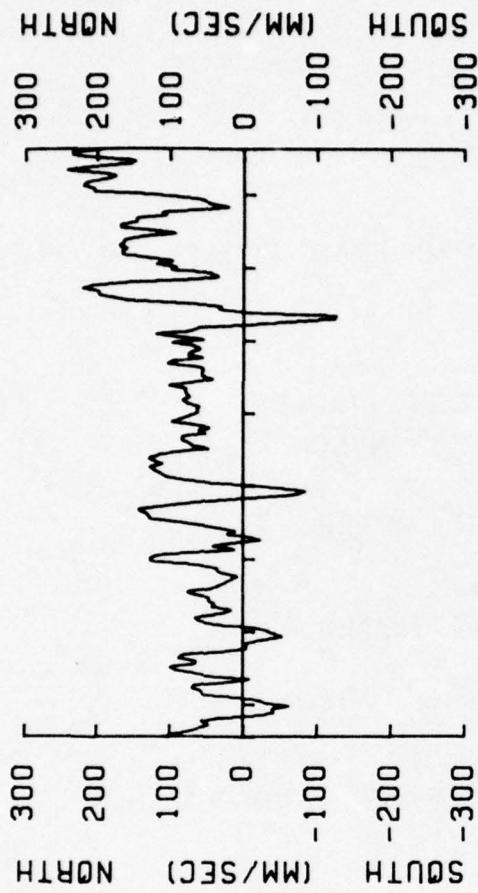
DURATION 8 DAYS 2 H 40 M 0 S





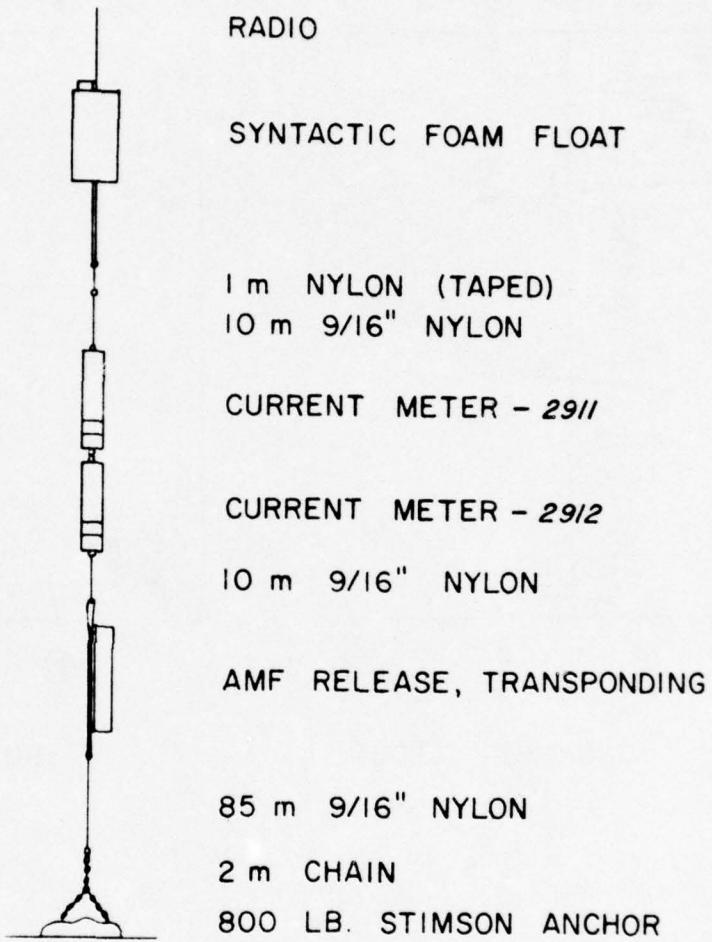
0. 60.  
 KILOMETERS  
 2905\$1H  
 521 M  
 69- IV -17 TO 69- IV -24





2905\$1H  
521 M

# STATION 291



Mooring No. 291

Set 69 Apr 16 39° 08.7N 70° 02.5W  
Year Month Day Latitude Longitude

Set by R. Heinmiller Ship R. V. Chain Cruise 90

Retrieved 69 Apr 24  
Year Month Day

Retrieved by R. Heinmiller Ship R. V. Chain Cruise 90

Purpose of Mooring: 1) Test of new syntactic foam float. 2) Part of acoustic net with 290 and 293. 3) Investigation of sampling intervals on deep stations

Mooring Type: Subsurface.

<u>Data Number</u>	<u>Instrument Number</u>	<u>Type</u>	<u>Depth Meters</u>	<u>Comments</u>
2911*	M-209	M.C.M.	2581	
2912	M-211	M.C.M.	2583	Electrical problems with rotor
Water depth			2682	

#### Hydrographic Stations

R. V. Chain cruise 90 Station 872

R. V. Chain cruise 90 Station 873

R. V. Chain cruise 90 Station 878

#### COMMENTS ON MOORING:

Data number 2911

Instrument No.: M-209

Type: Magnetic tape current meter

Depth: 2581 m

Water depth: 2682 m

Start time: 69-IV-16 165533

Stop time: 69-IV-24 144033

Duration: 7d 21h 45m

Sampling scheme: Continuous

one reading every 5 seconds

COMMENTS:

STATS

MEAN	=	EAST	28.24
STD. ERR.	=	1.18	.86
VARIANCE	=	1063.64	561.75
STD. DEV.	=	32.61	23.70
KURTOSIS	=	2.16	2.78
SKEWNESS	=	-.39	-.47

DATA/ 29110900

SPEED	=	57.82	EAST & NORTH	57.82
COVARIANCE	=	.84	STD. ERR. OF COVARIANCE	54.56
STD. DEV. OF COVARIANCE	=	672.23	STD. DEV. OF COVARIANCE	1504.23
CORRELATION COEFFICIENT	=	25.93	VECTOR MEAN	-.094
VECTOR VARIANCE	=	2.51	VECTOR VARIANCE	48.89
STD. DEV.	=	.40	STD. DEV.	812.70
				28.51

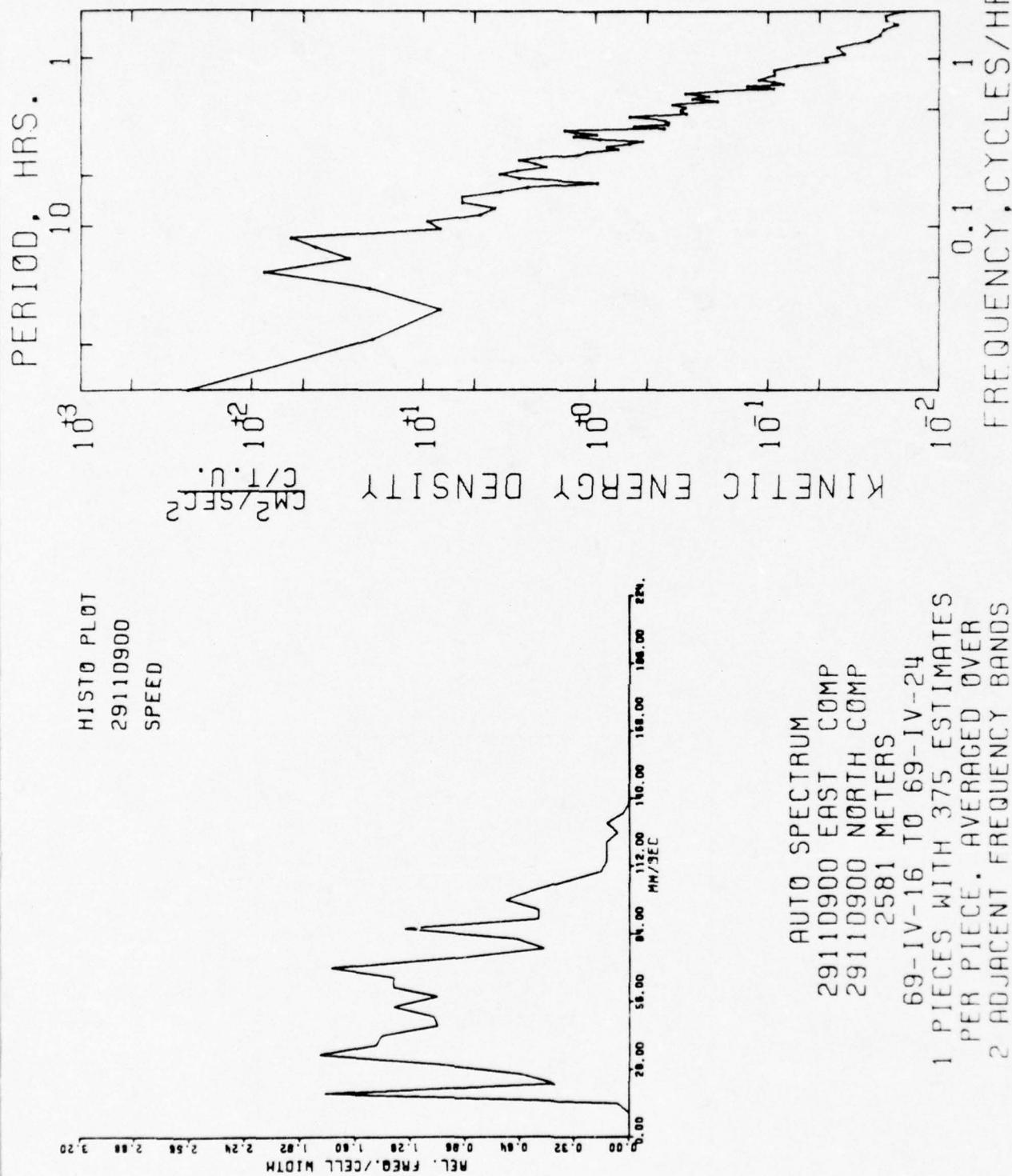
UNITS OF RAW DATA VARIABLES = MM/SEC

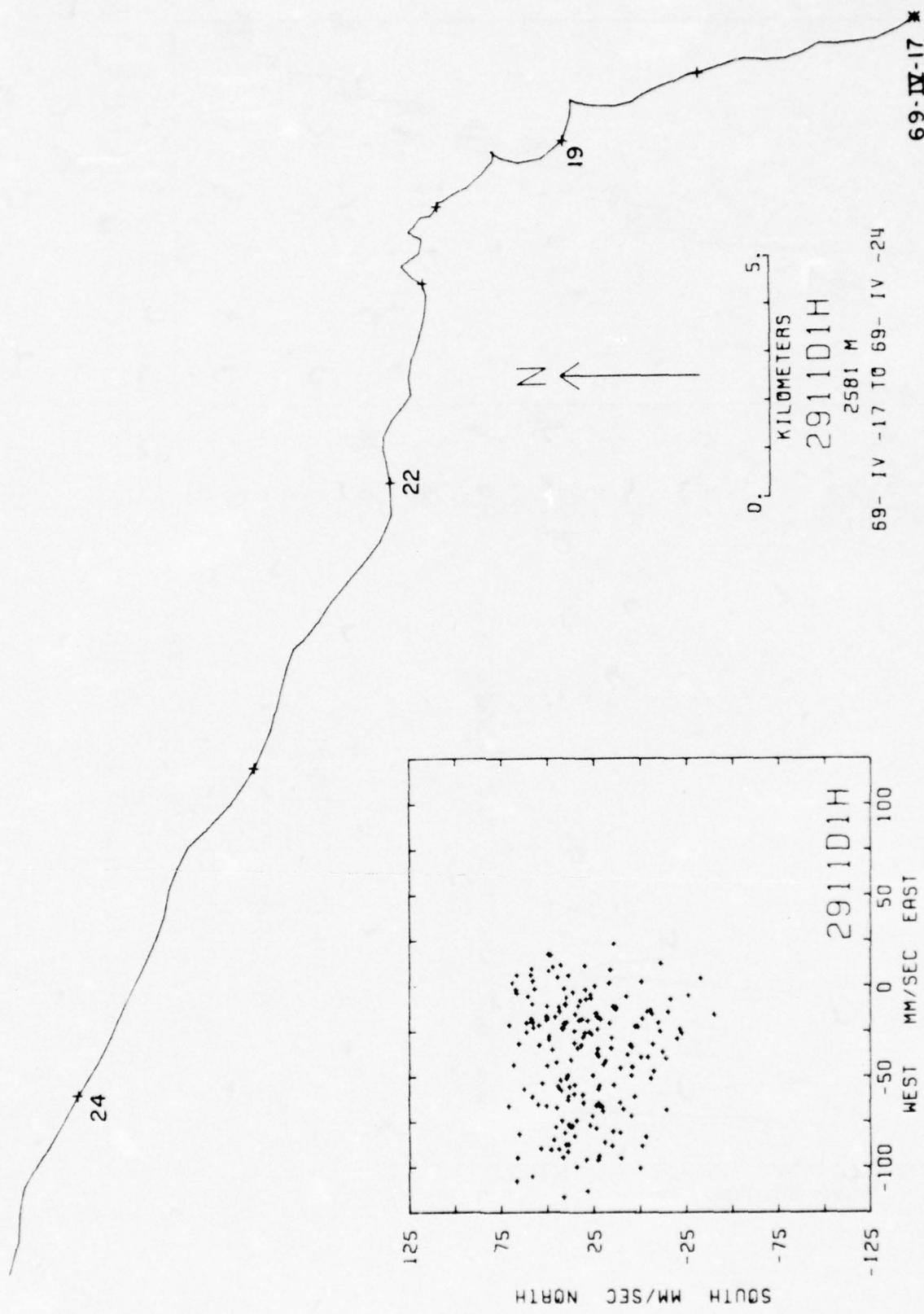
SAMPLE SIZE = 760 POINTS

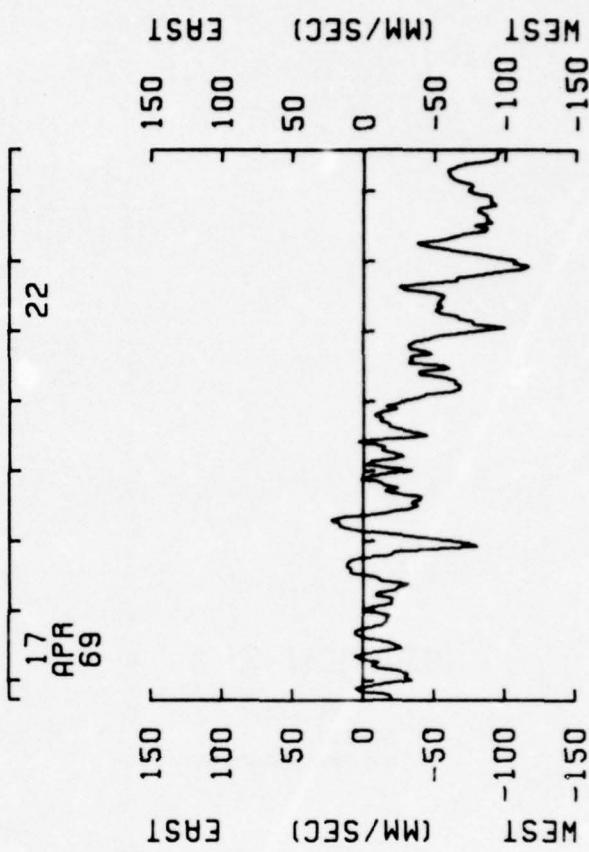
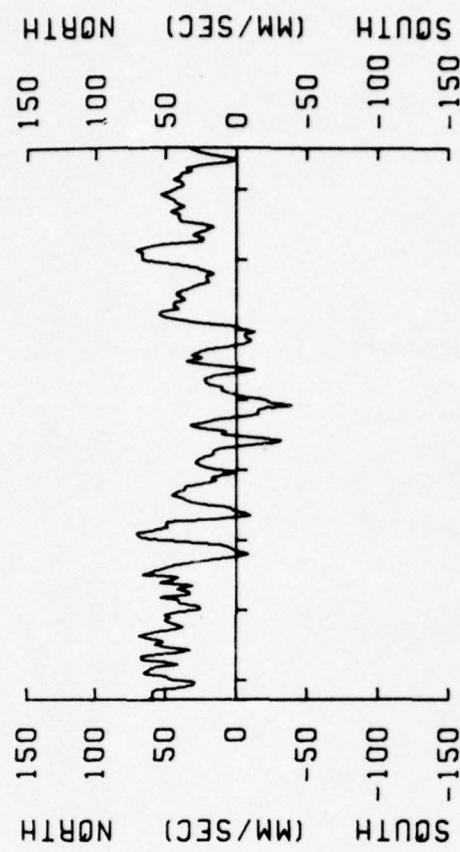
SPANNING RANGE

FROM 69- IV -16 16.55.33  
TO 69- IV -24 14.40.33

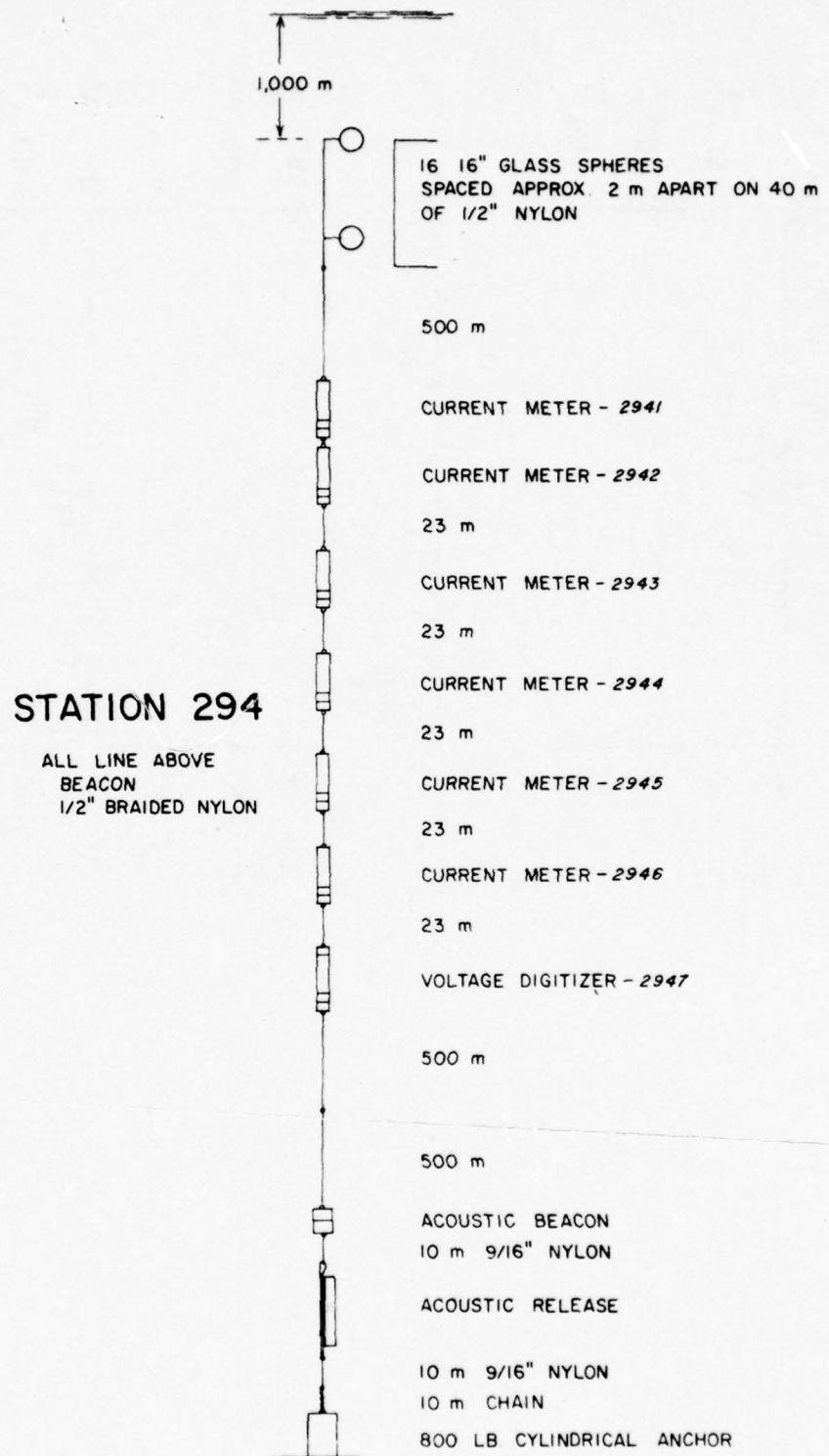
DURATION 7 DAYS 21 H 45 M 0 S







291101H  
2581M



Mooring No. 294

Set 69 Apr 17  
Year Month Day

39° 10.3N  
Latitude

70° 00.0W  
Longitude

Set by R. Heinmiller

Ship R. V. Chain

Cruise 90

Retrieved 69 Apr 26  
Year Month Day

Retrieved by R. Heinmiller

Ship R. V. Chain

Cruise 90

Purpose of Mooring: 1) Shear measurements.  
2) Electromagnetic transport measurements.

Mooring Type: Subsurface

<u>Data Number</u>	<u>Instrument Number</u>	<u>Type</u>	<u>Depth Meters</u>	<u>Comments</u>
2941*	M-142	M.C.M.	1512	
2942*	M-122	M.C.M.	1514	
2943	M-204	M.C.M.	1541	Bad CRT-1 board
2944*	M-159	M.C.M.	1564	
2945*	M-127	M.C.M.	1598	
2946*	M-170	M.C.M.	1614	
2947	N/A	Volt. Dig.	1641	No useable rotor, voltage data no good.

Water depth 2674

#### Hydrographic Stations

R. V. Chain cruise 90 Station 872

R. V. Chain cruise 90 Station 873

R. V. Chain cruise 90 Station 878

#### COMMENTS ON MOORING:

Mooring was set anchor first.

Data number 2941

Instrument No.: M-142

Type: Magnetic tape current meter

Depth: 1512 m

Water depth: 2674 m

Start time: 69-IV-17 223700

Stop time: 69-IV-26 110700

Duration: 8d 12h 30m

Sampling scheme: Interval

time between strobes = 5.27 seconds

no. of strobes per interval = 23

interval time = 900 seconds

COMMENTS:

STATS

MEAN	=	-33.86	EAST	18.19	NORTH
STD. ERR.	=	.58		.66	
VARIANCE	=	287.08		381.55	
STD. DEV.	=	16.94		18.01	
KURTOSIS	=	2.74		2.71	
SKEWNESS	=	.25		-.16	

DATA/ 29418900

SPEED	=	43.51	MM/MM	EAST & NORTH	=	MM/MM
	=	.57	MM	COVARIANCE	=	-44.51
	=	289.67	MM	STD. ERR. OF COVARIANCE	=	29.59
	=	18.42	MM	STD. DEV. OF COVARIANCE	=	846.93
	=	2.12	MM	CORRELATION COEFFICIENT	=	-.198
	=	.19	MM	VECTOR MEAN	=	38.92
	=		MM	VECTOR VARIANCE	=	924.91
	=		MM	STD. DEV.	=	18.01

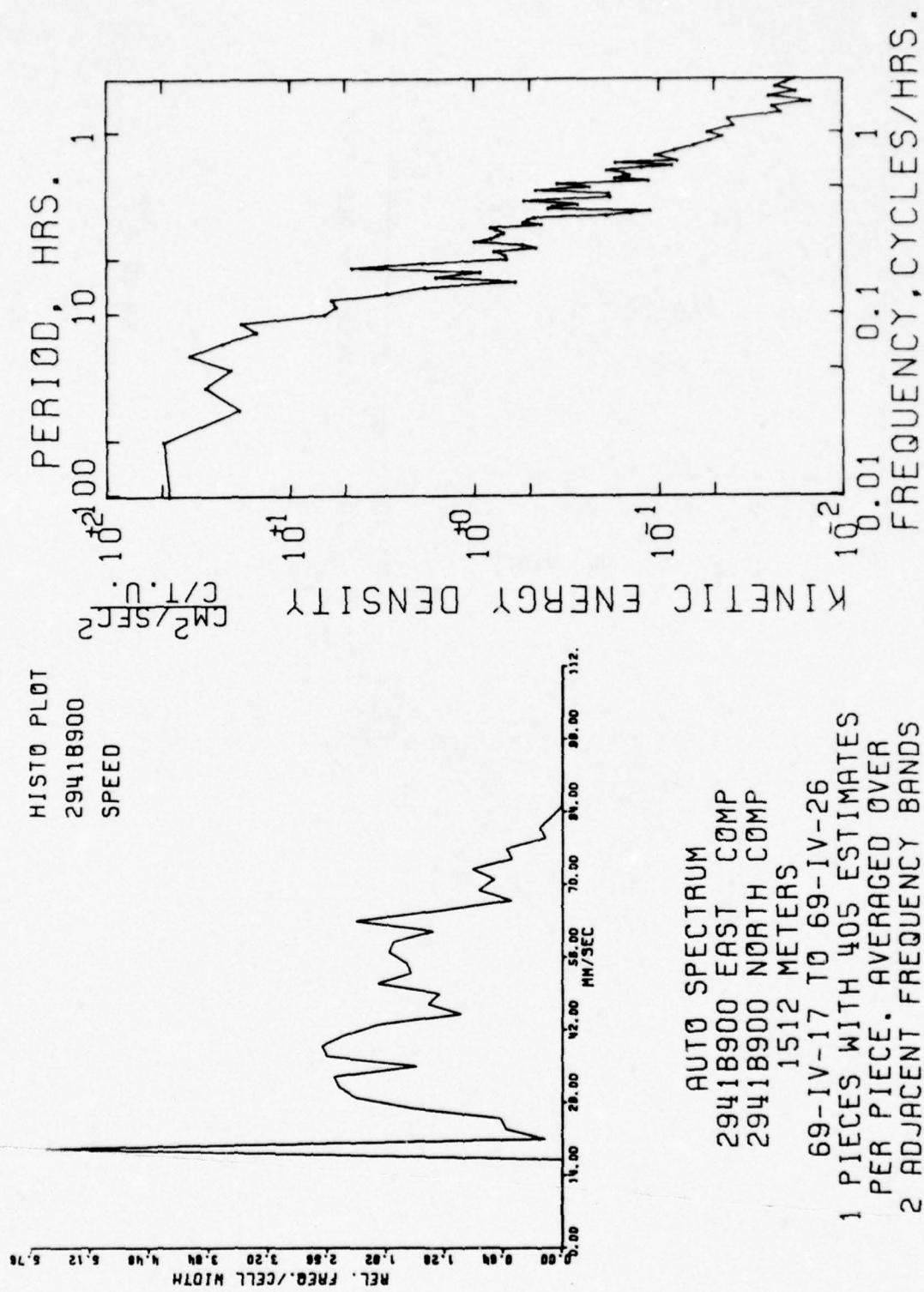
UNITS OF RAW DATA VARIABLES = MM/SEC

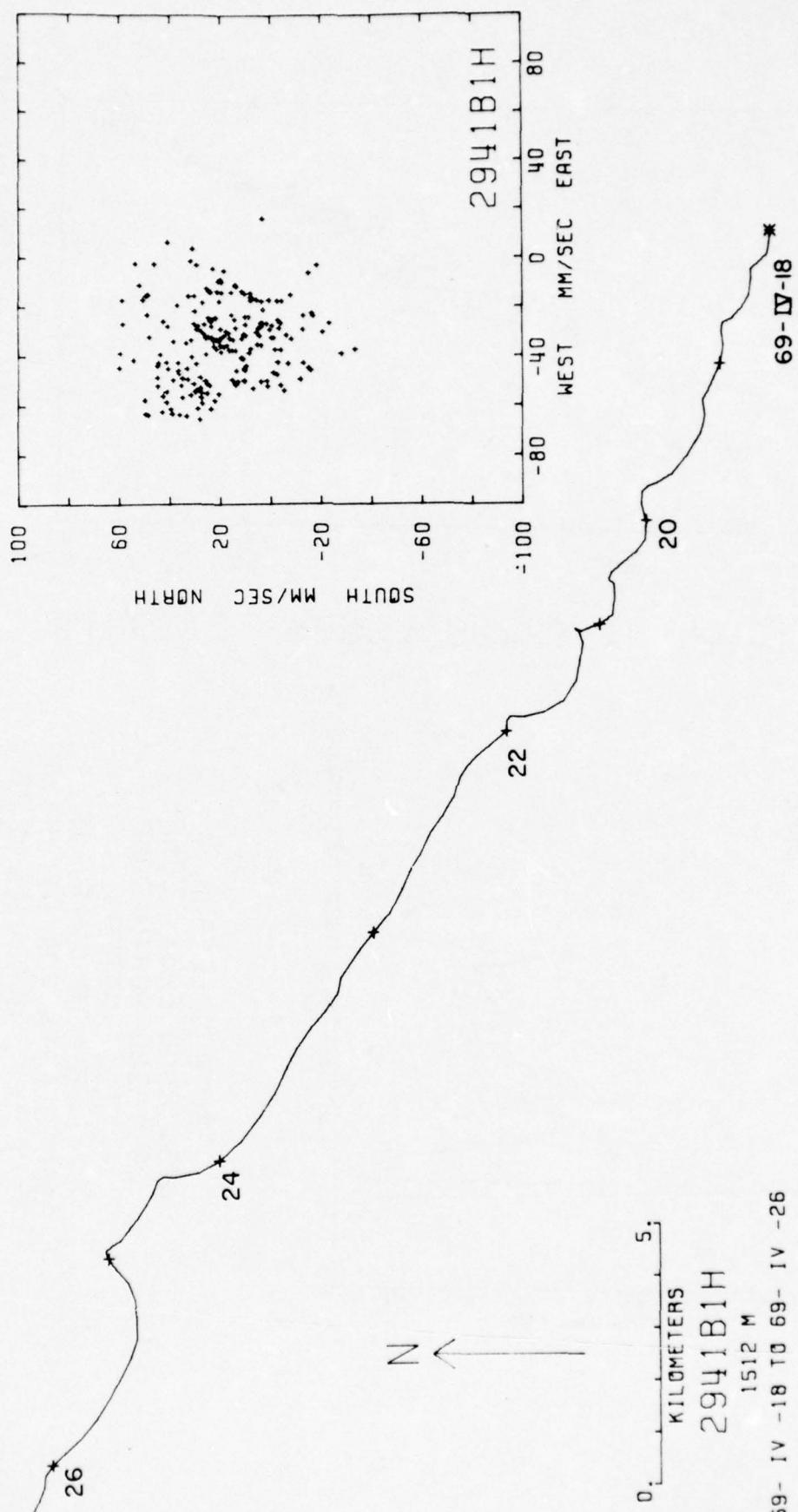
SAMPLE SIZE = 819 POINTS

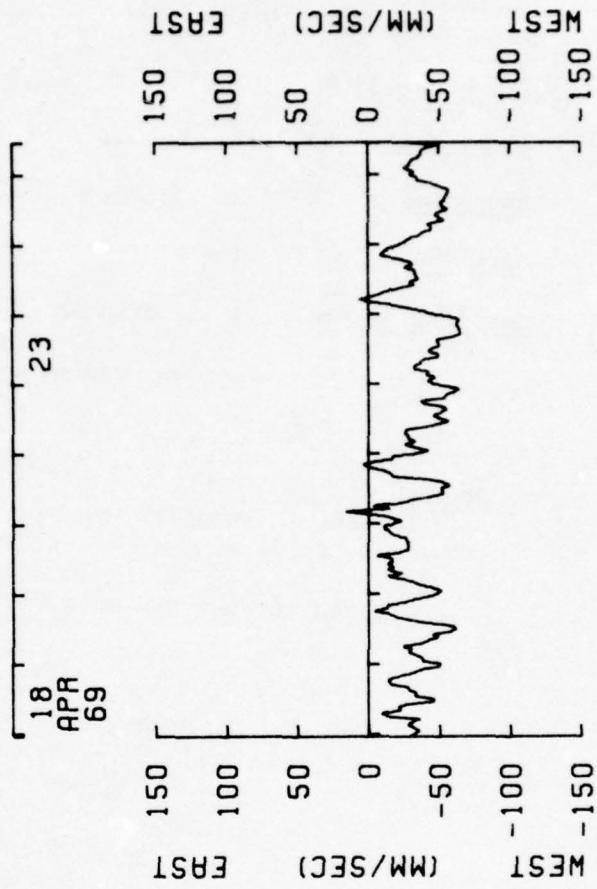
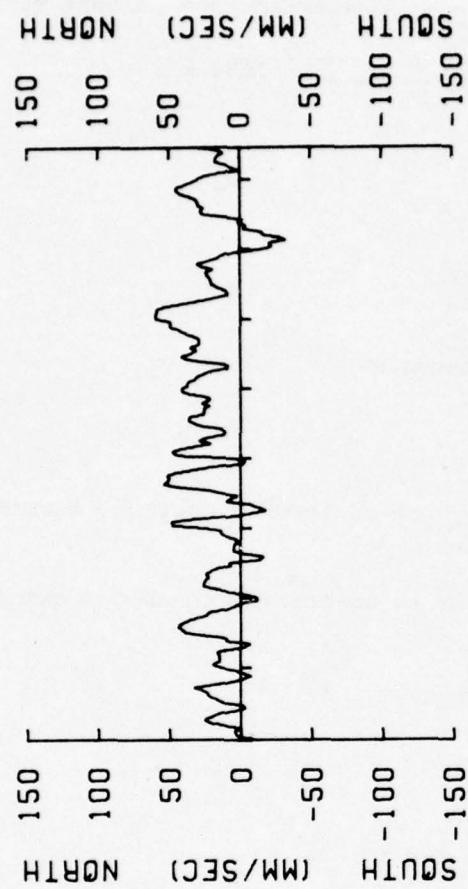
SPANNING RANGE

FROM 69- IV -17 22.37.00  
TO 69- IV -26 11.07.00

DURATION 8 DAYS 12 H 30 M 0 S







2941B1H  
1512 M

Data number 2942

Instrument No.: M-122

Type: Magnetic tape current meter

Depth: 1514 m

Water depth: 2674 m

Start time: 69-IV-17 205002

Stop time: 69-IV-25 033002

Duration: 7d 6h 40m

Sampling scheme: Continuous

one reading every 5 seconds

COMMENTS:

Time base is suspect. There is an error of at least 3 hours 51 minutes in the 12 hour clock.

Processed through the SHEAR TIME program in an attempt to smooth out the time base.

STATS

DATA/ 2942G600

MEAN	-35.23	13.02
STD. ERR.	.55	.55
VARIANCE	322.89	318.08
STD. DEV.	17.87	17.78
KURTOSIS	2.82	2.44
SKEWNESS	-.19	-.08

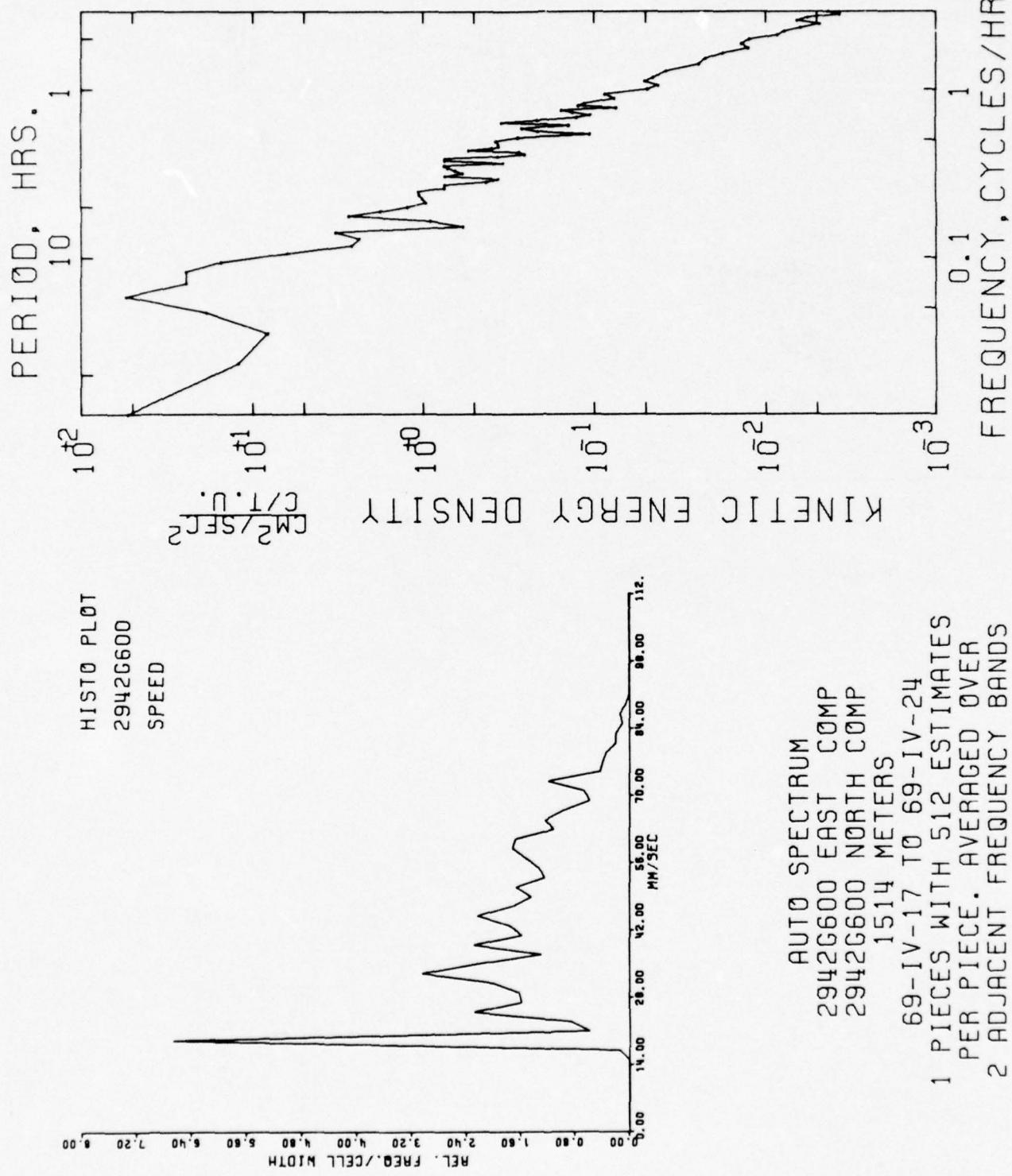
SPEED	=	NNNNN	EAST & NORTH	=	NNNNN
41.89	=	COVARIANCE	=	-85.85	
.53	=	STD. ERR. OF COVARIANCE	=	23.24	
285.43	=	STD. DEV. OF COVARIANCE	=	752.84	
17.19	=	CORRELATION COEFFICIENT	=	-.288	
2.21	=	VECTOR MEAN	=	37.58	
.95	=	VECTOR VARIANCE	=	319.48	
	=	STD. DEV.	=	17.87	

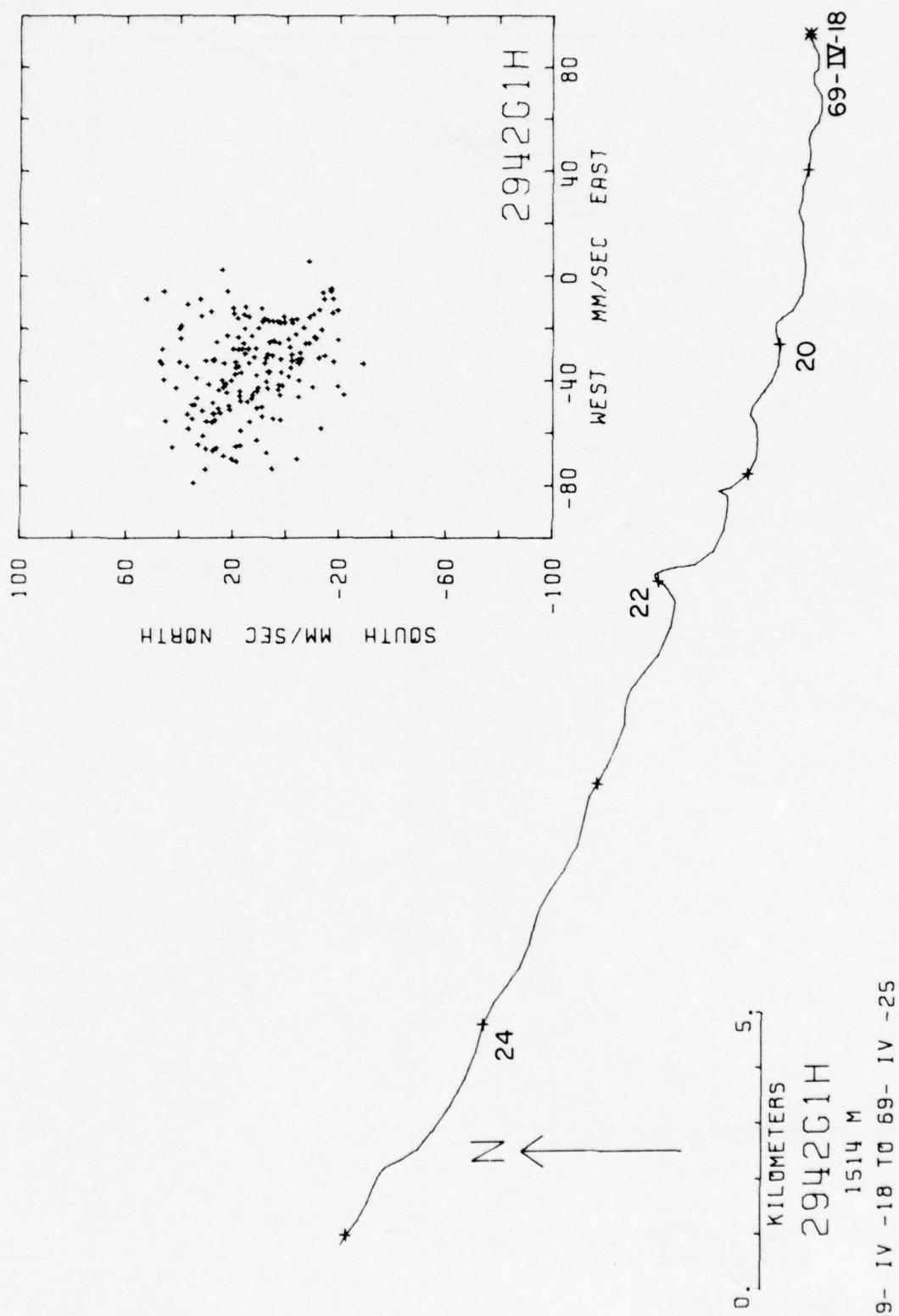
UNITS OF RAW DATA VARIABLES = MM/SEC

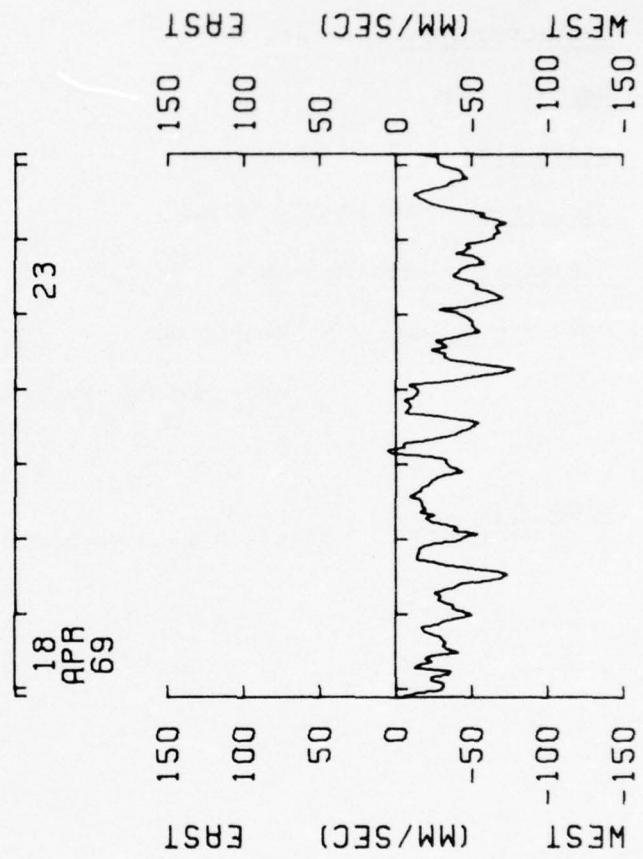
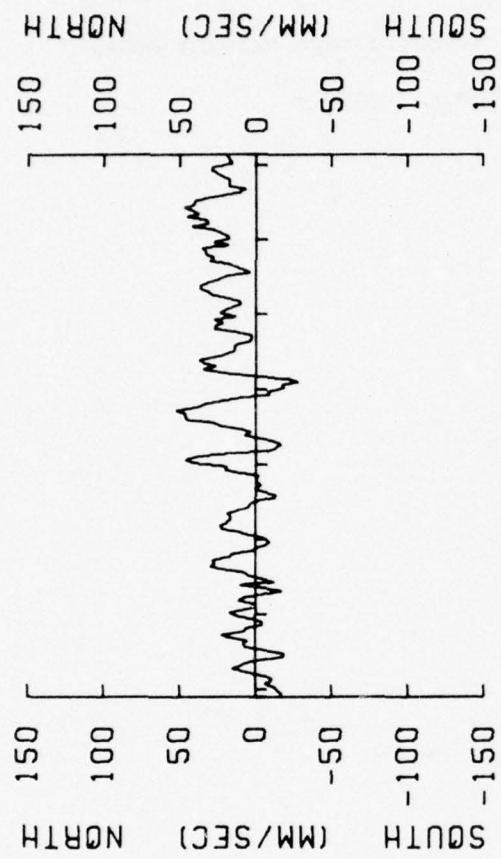
SAMPLE SIZE = 1049 POINTS

SPANNING RANGE  
FROM 69- IV -17 20.50.02  
TO 69- IV -25 03.30.02

DURATION 7 DAYS 6 H 40 M 0 S







2942G1H  
1514 M

Data number 2944

Instrument No.: M-159

Type: Magnetic tape current meter

Depth: 1564 m

Water depth: 2674 m

Start time: 69-IV-17 205001

Stop time: 69-IV-26 043001

Duration: 8d 7h 40m

Sampling scheme: Continuous

one reading every 5 seconds

COMMENTS:

Mechanical clock was 4 minutes off.

**STATS**

	EAST	NORTH
MEAN	-34.22	22.44
STD. ERR.	.57	.53
VARIANCE	993.29	994.87
STD. DEV.	19.83	18.30
KURTOSIS	2.18	2.62
SKEWNESS	-.36	.09

**DATA/ 2944\$600**

	EAST & NORTH	
SPEED	44.18	COVARIANCE
	.61	STD. ERR. OF COVARIANCE
	450.03	STD. DEV. OF COVARIANCE
	21.21	CORRELATION COEFFICIENT
	1.83	VECTOR MEAN
	.25	VECTOR VARIANCE
		STD. DEV.

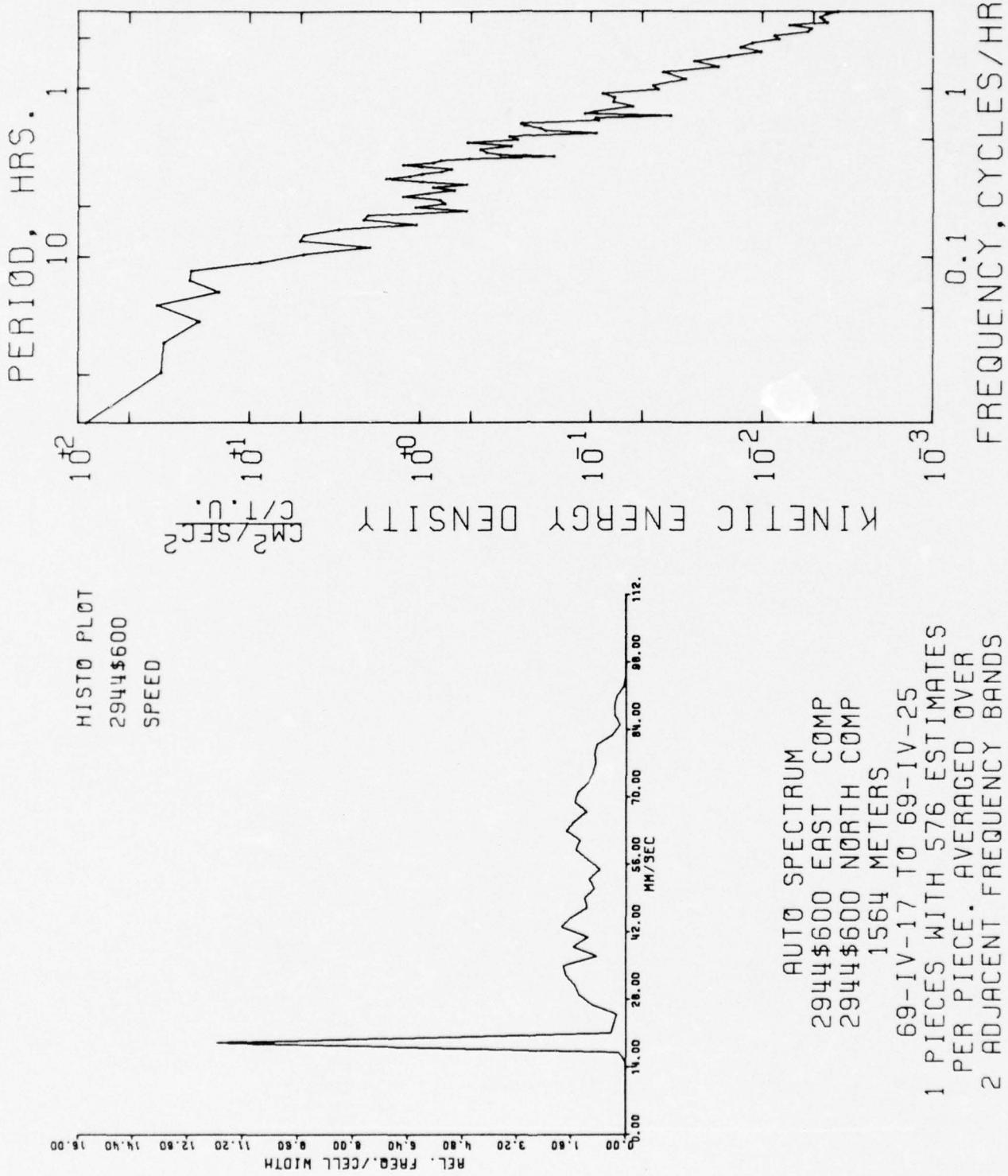
UNITS OF RAW DATA VARIABLES = MM/SEC

SAMPLE SIZE = 1199 POINTS

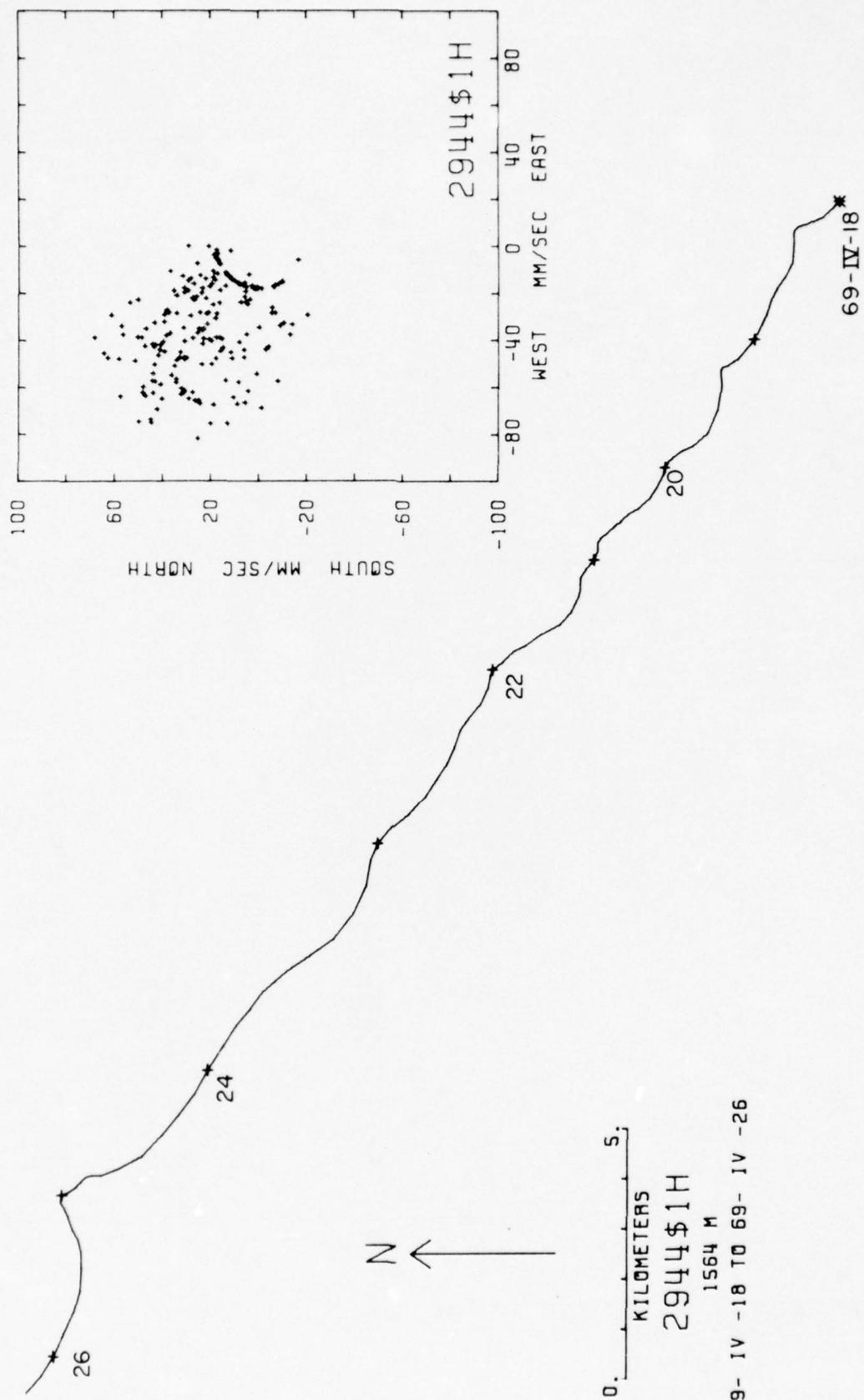
SPANNING RANGE

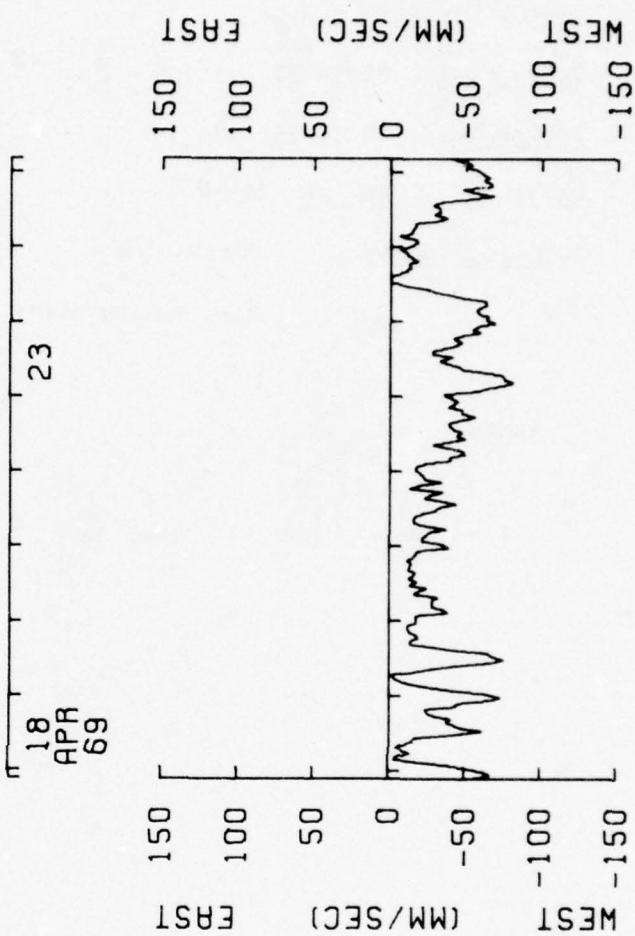
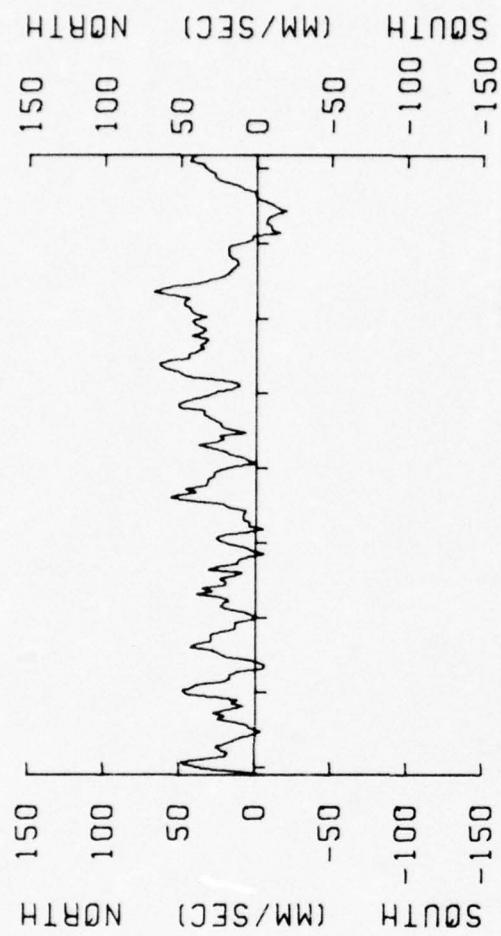
FROM 69- IV -17 20.50.01  
TO 69- IV -26 04.30.01

DURATION 8 DAYS 7 H 40 M 0 S



50





1564 M  
2944\$1H

Data number 2945

Instrument No.: M-127

Type: Magnetic tape current meter

Depth: 1598 m

Water depth: 2674 m

Start time: 69-IV-17 204206

Stop time: 69-IV-25 230706

Duration: 8d 2h 25m

Sampling scheme: Continuous

one reading every 5 seconds

COMMENTS:

Time base suspect last two days.

**STATS**

	EAST	NORTH
MEAN	-35.85	24.00
STD. ERR.	.44	.41
VARIANCE	453.48	389.18
STD. DEV.	21.30	19.73
KURTOSIS	2.93	2.72
SKEWNESS	-.42	-.03

**DATA/ 2945C300**

SPEED	# #####	EAST & NORTH	# #####
47.05	# COVARIANCE	=	-151.57
.46	# STD. ERR. OF COVARIANCE	=	23.26
497.65	# STD. DEV. OF COVARIANCE	=	1123.68
22.31	# CORRELATION COEFFICIENT	=	-.361
2.45	# VECTOR MEAN	=	43.23
.43	# VECTOR VARIANCE	=	421.93
	# STD. DEV.	=	20.53

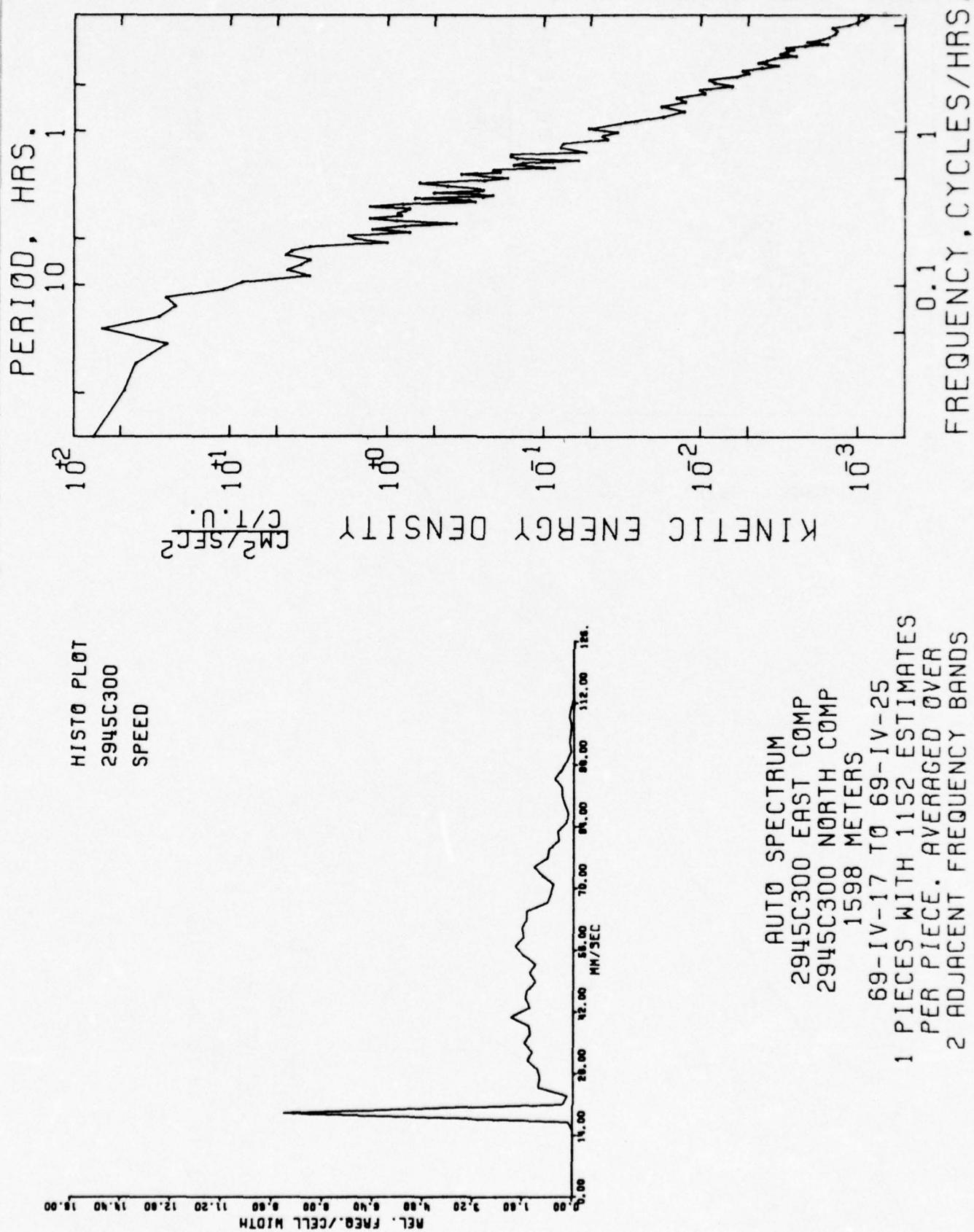
UNITS OF RAW DATA VARIABLES = MM/SEC

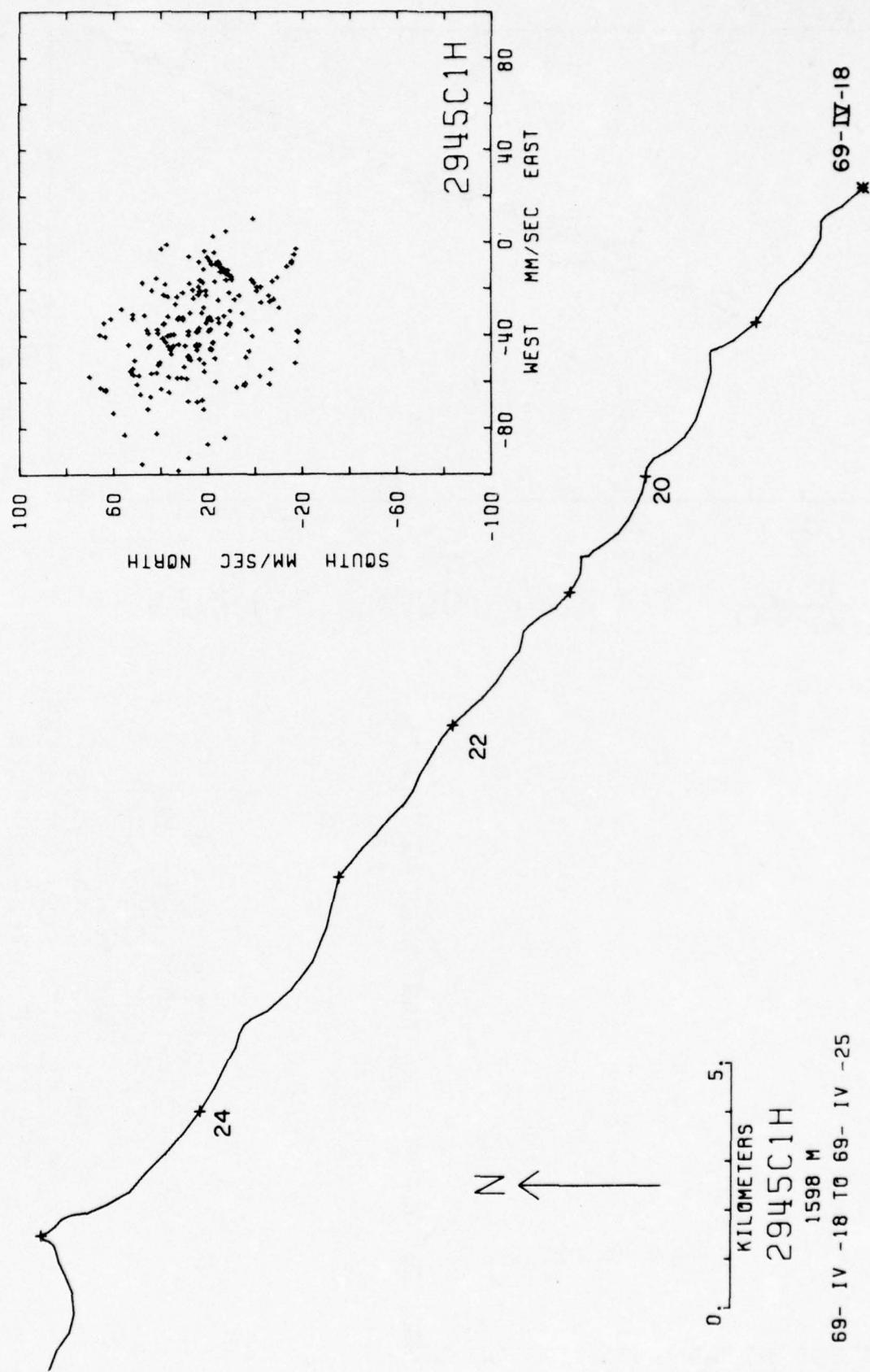
SAMPLE SIZE = 2334 POINTS

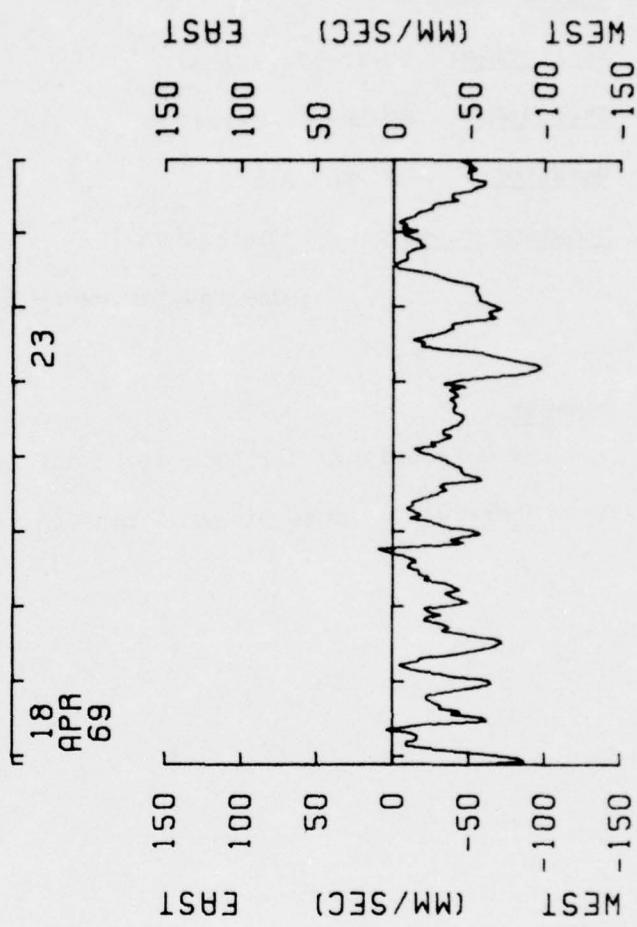
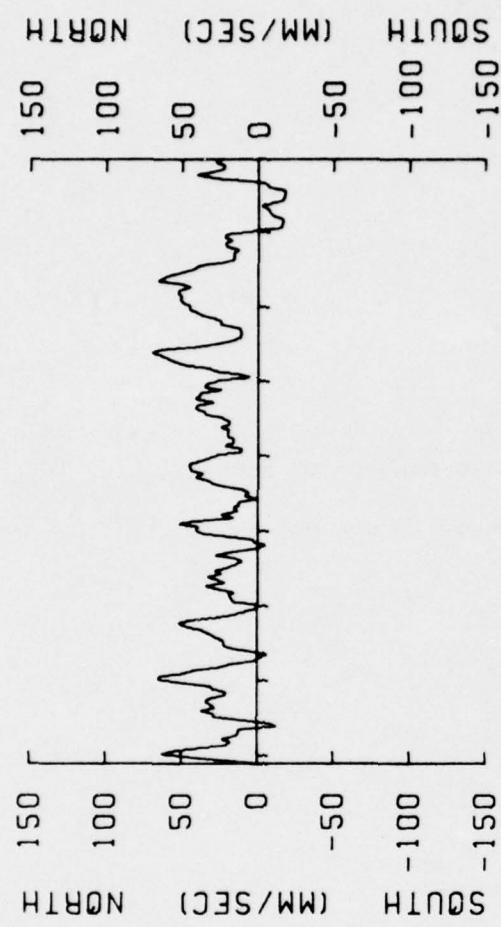
**SPANNING RANGE**

FROM 69- IV -17 20.42.06  
TO 69- IV -25 23.07.06

DURATION 8 DAYS 2 H 25 M 0 S







Data number 2946

Instrument No.: M-170

Type: Magnetic tape current meter

Depth: 1614 m

Water depth: 2674 m

Start time: 69-IV-17 204547

Stop time: 69-IV-26 021047

Duration: 8d 5h 25m

Sampling scheme: Continuous

one reading every 5 seconds

COMMENTS:

Vane is sticky. 12-hour clock off by at least 6 minutes 47 seconds.

There was a loose piece of tape in vane cage upon recovery.

**STATS**

MEAN	=	EAST	-37.42	NORTH	27.68
STD. ERR.	=		.64		.45
VARIANCE	=		969.07		483.77
STD. DEV.	=		31.13		21.99
KURTOSIS	=		3.71		2.46
SKEWNESS	=		.35		-.29

**DATA/ 29460900**

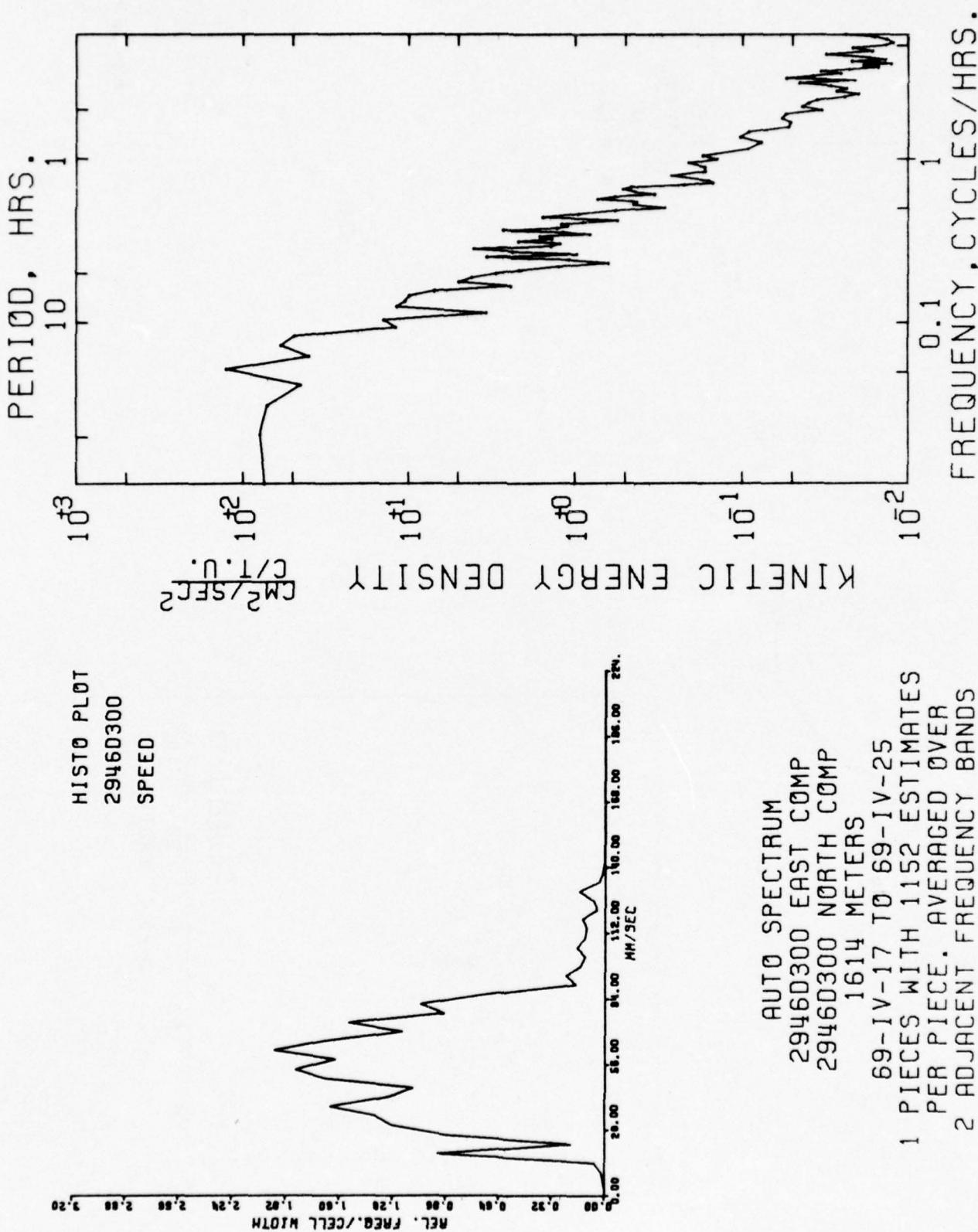
SPEED	=	55.89	=	EAST & NORTH	=	61.87
	=	.46	=	COVARIANCE	=	30.20
	=	485.60	=	STD. ERR. OF COVARIANCE	=	1470.15
	=	22.26	=	STD. DEV. OF COVARIANCE	=	.090
	=	3.53	=	CORRELATION COEFFICIENT	=	46.67
	=	.58	=	VECTOR MEAN	=	728.42
	=		=	VECTOR VARIANCE	=	26.95
	=		=	STD. DEV.	=	

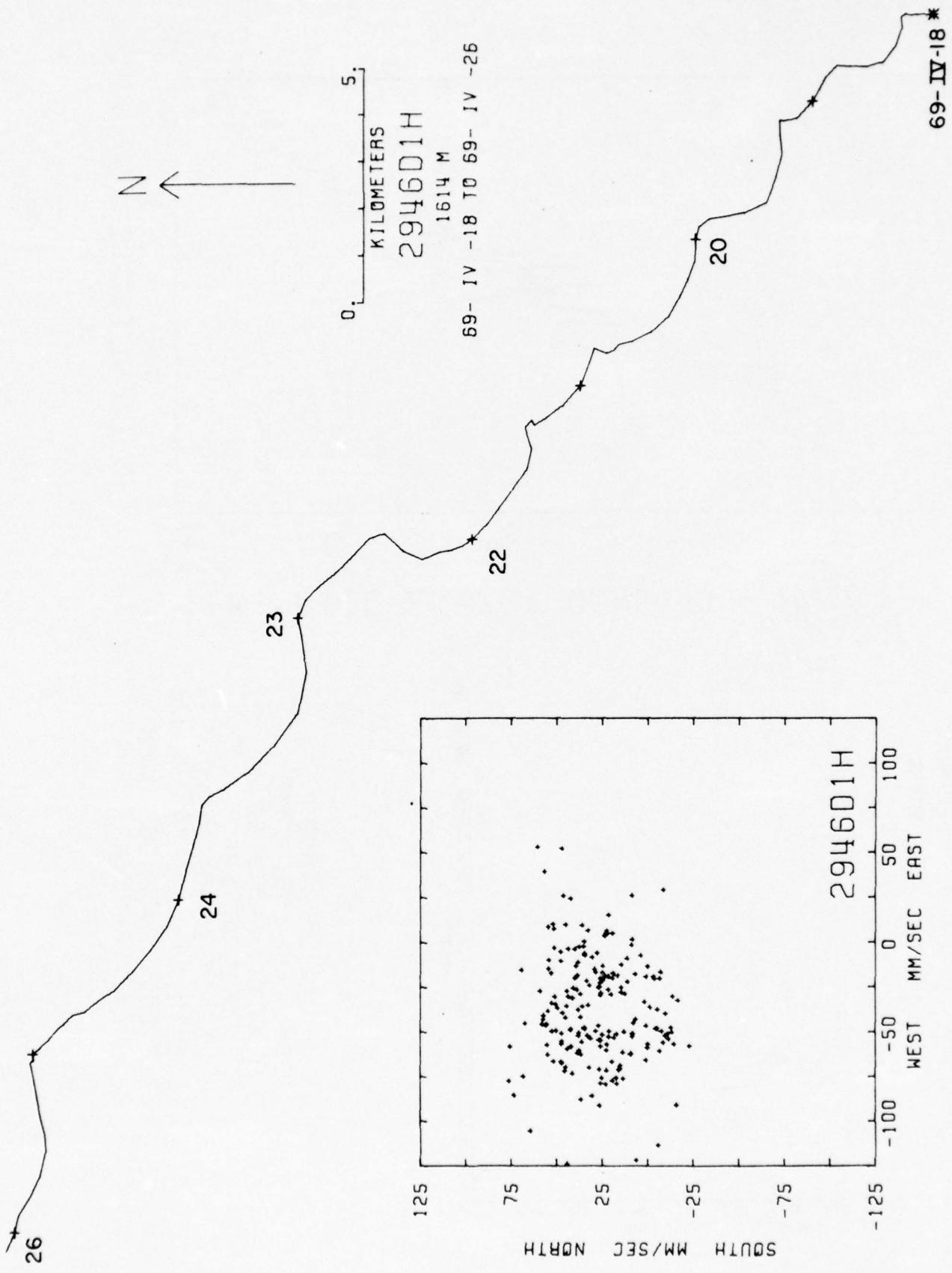
UNITS OF RAW DATA VARIABLES = MM/SEC

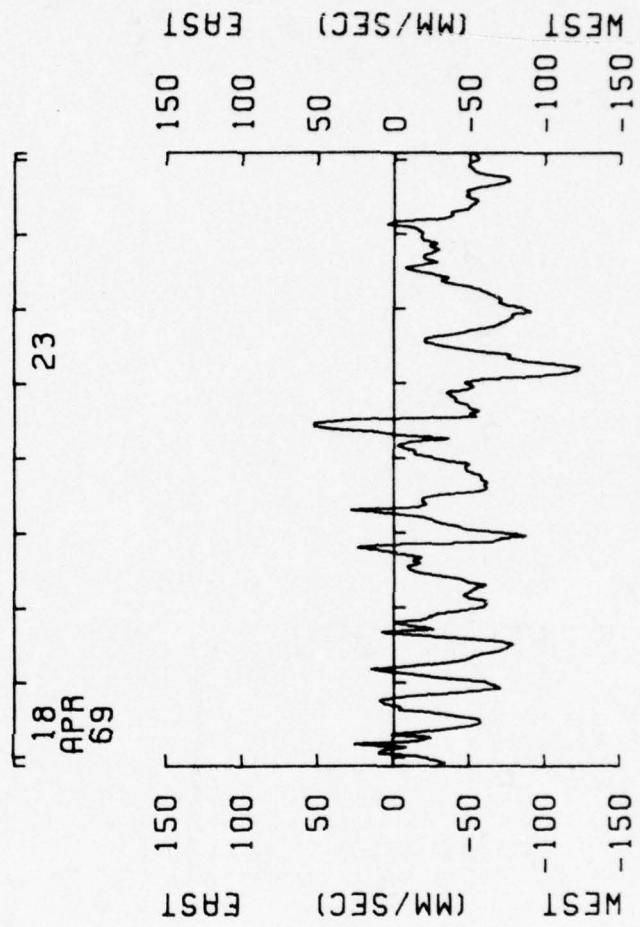
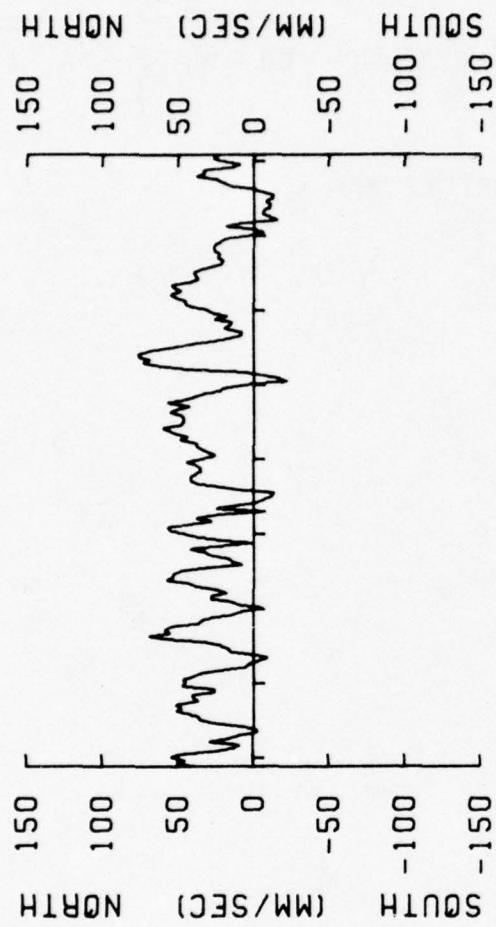
SAMPLE SIZE = 2370 POINTS

SPANNING RANGE  
FROM 69- IV -17 20.45.47  
TO 69- IV -26 02.10.47

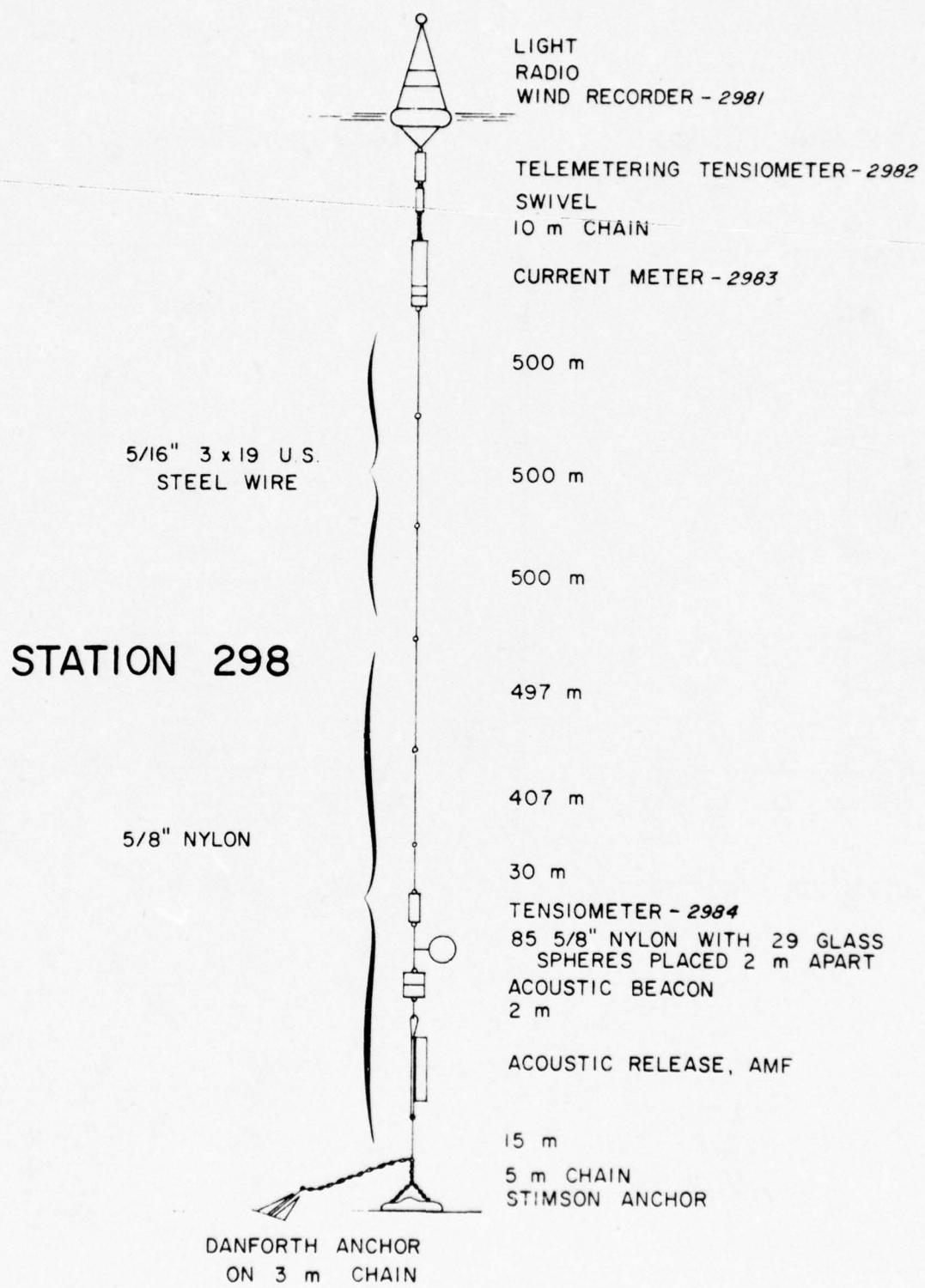
DURATION 8 DAYS 5 H 25 M 0 S







294601H  
1614M



Mooring No. 298

Set 69 Apr 26 39° 09.1N 69° 59.0W  
Year Month Day Latitude Longitude

Set by R. Heinmiller Ship R. V. Chain Cruise 90

Retrieved 69 Aug 12  
Year Month Day

Retrieved by R. Heinmiller Ship R. V. Chain Cruise 95

Purpose of Mooring: Four-month wire test

Mooring Type: Surface

<u>Data Number</u>	<u>Instrument Number</u>	<u>Type</u>	<u>Depth Meters</u>	<u>Comments</u>
2981*	W-125X	M.W.R.	0	
2982	1013	Tel. Tens.	2	
2983*	M-205	M.C.M.	14	
2984	1019	Tens.	2566	

Water depth 2675

#### Hydrographic Stations

R. V. Chain cruise 90 Station 879

R. V. Chain cruise 95 Station 922

#### COMMENTS ON MOORING:

Data number 2981

Instrument No.: W-125X

Type: Magnetic tape wind recorder

Depth: -0-

Water depth: 2675 m

Start time: 69-IV-27 014500

Stop time: 69-VIII-03 234500

Duration: 98d 22h

Sampling scheme: Interval

time between strobes = 5 seconds

no. of strobes per interval = 24

interval time = 1800 seconds

COMMENTS:

Record truncated at August 2, 1969 because of bad anemometer. Wind direction follows ocean current conventions to facilitate comparisons; add 180° to direction for meteorological data.

STATS

DATA/ 2981WL1800

MEAN	=	10.93	EAST	NORTH	SPEED	=	61.53	MMMM	EAST & NORTH	=	881.16
STD. ERR.	=	.63		.73	COVARIANCE	=	.41	MMMM	STD. ERR. OF COVARIANCE	=	30.79
VARIANCE	=	1804.08		2516.15	STD. DEV. OF COVARIANCE	=	812.71	MMMM	STD. DEV. OF COVARIANCE	=	2121.78
STD. DEV.	=	43.64		50.16	CORRELATION COEFFICIENT	=	28.51	MMMM	CORRELATION COEFFICIENT	=	.409
KURTOSIS	=	2.98		2.29	VECTOR MEAN	=	9.20	MMMM	VECTOR MEAN	=	13.96
SKEWNESS	=	.09		-.06	VECTOR VARIANCE	=	.64	MMMM	VECTOR VARIANCE	=	2210.12
					STD. DEV.	=		MMMM	STD. DEV.	=	47.01

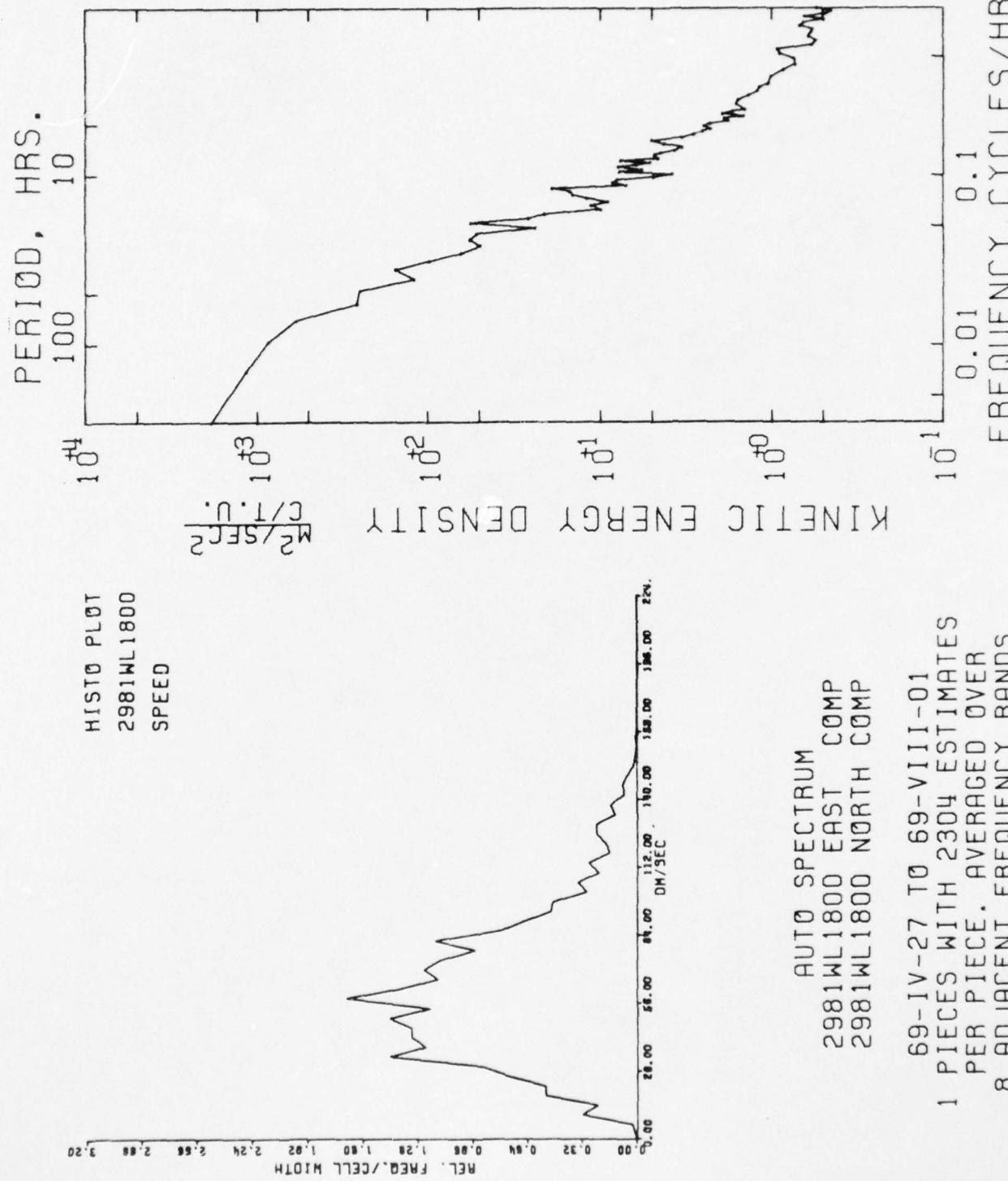
UNITS OF RAW DATA VARIABLES = DM/SEC

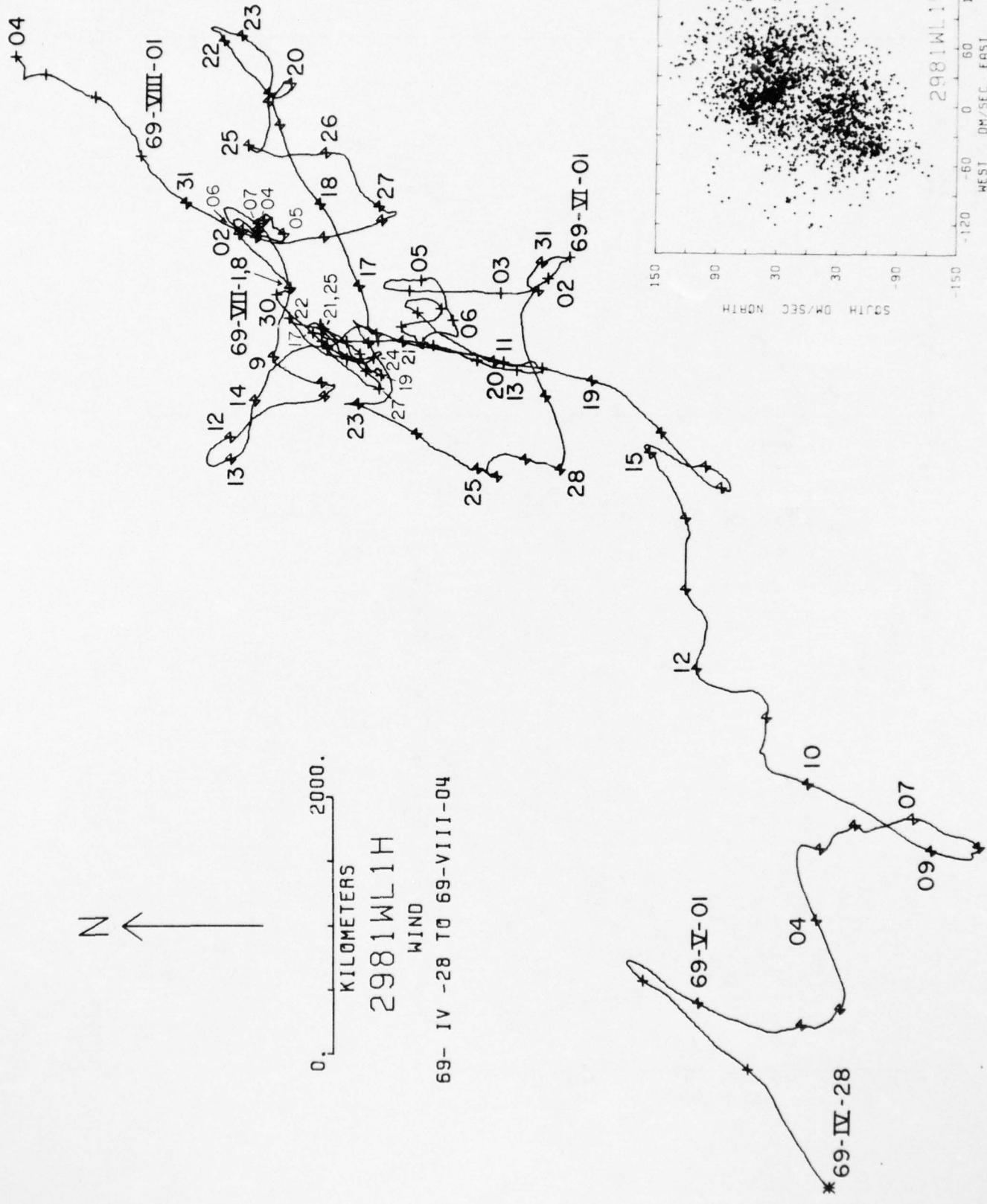
SAMPLE SIZE = 4749 POINTS

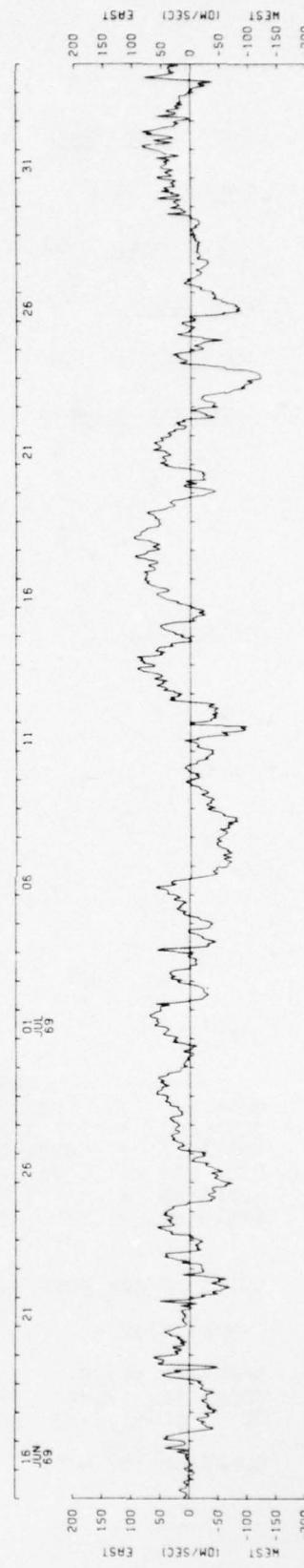
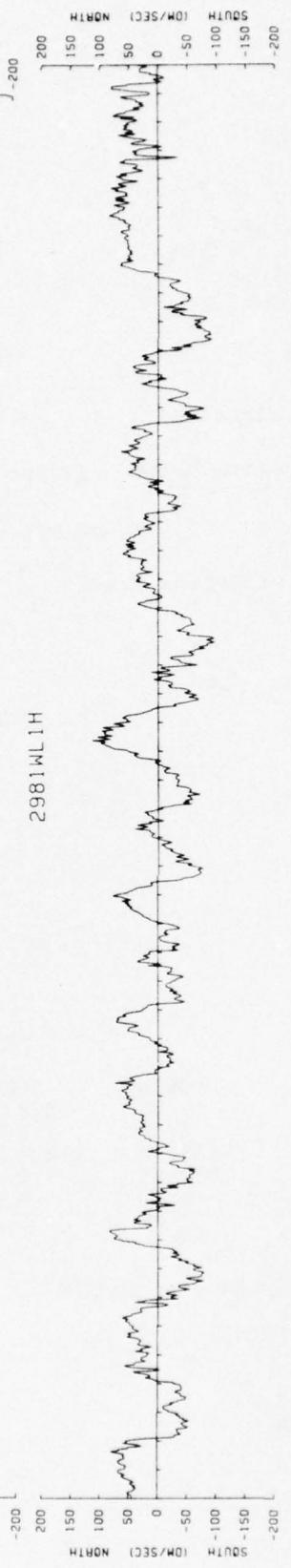
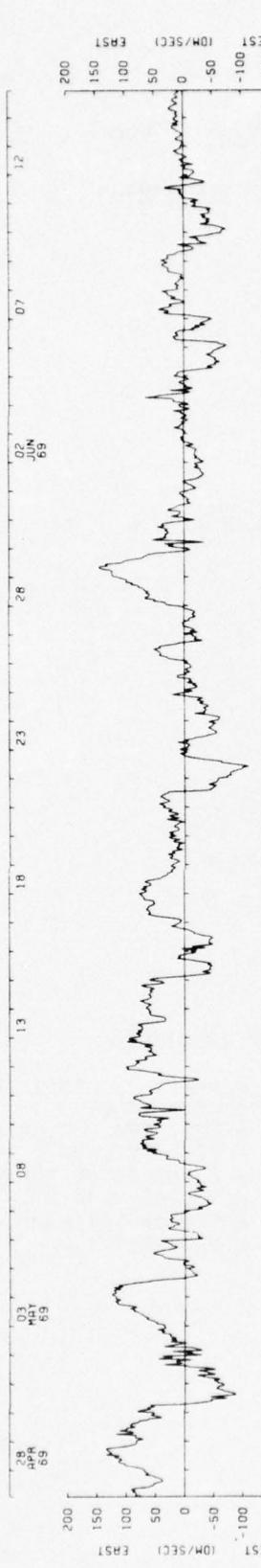
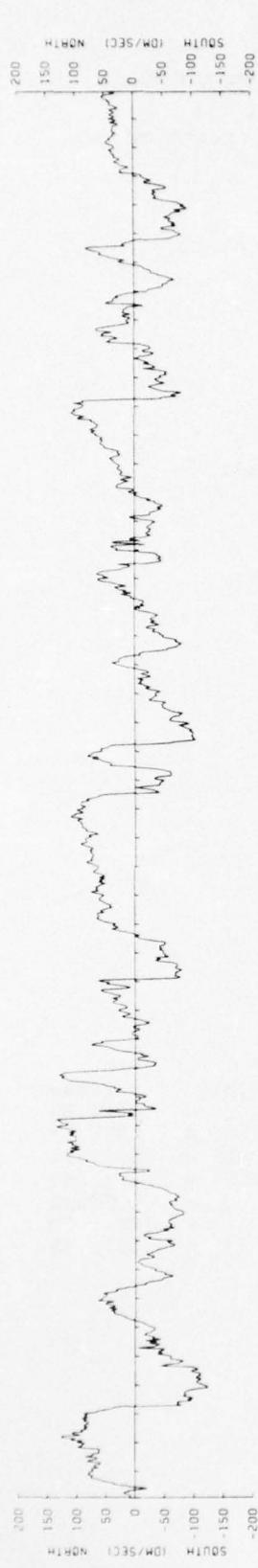
SPANNING RANGE

FROM 69- IV -27 01.45.00  
TO 69-VIII-03 23.45.00

DURATION 98 DAYS 22 H 0 M 0 S







Data number 2983

Instrument No.: M-205

Type: Magnetic tape current meter

Depth: 14 m

Water depth: 2675 m

Start time: 69-IV-27 034507

Stop time: 69-VIII-12 114507

Duration: 107d 8h

Sampling scheme: Interval

time between strobes = 5 seconds

no. of strobes per interval = 24

interval time = 1800 seconds

COMMENTS:

STATS

MEAN	=	-25.02	EAST
STD. ERR.	=	3.25	NORTH
VARIANCE	=	54284.68	
STD. DEV.	=	292.99	
KURTOSIS	=	9.41	
SKEWNESS	=	.20	

DATA/ 2983E1800

SPEED	=	6768.94	MM/SEC
COVARIANCE	=	1325.53	
STD. ERR. OF COVARIANCE	=	85152.24	
STD. DEV. OF COVARIANCE	=	.094	
CORRELATION COEFFICIENT	=	88.39	
VECTOR MEAN	=	74411.20	
VECTOR VARIANCE	=	272.78	
STD. DEV.	=		

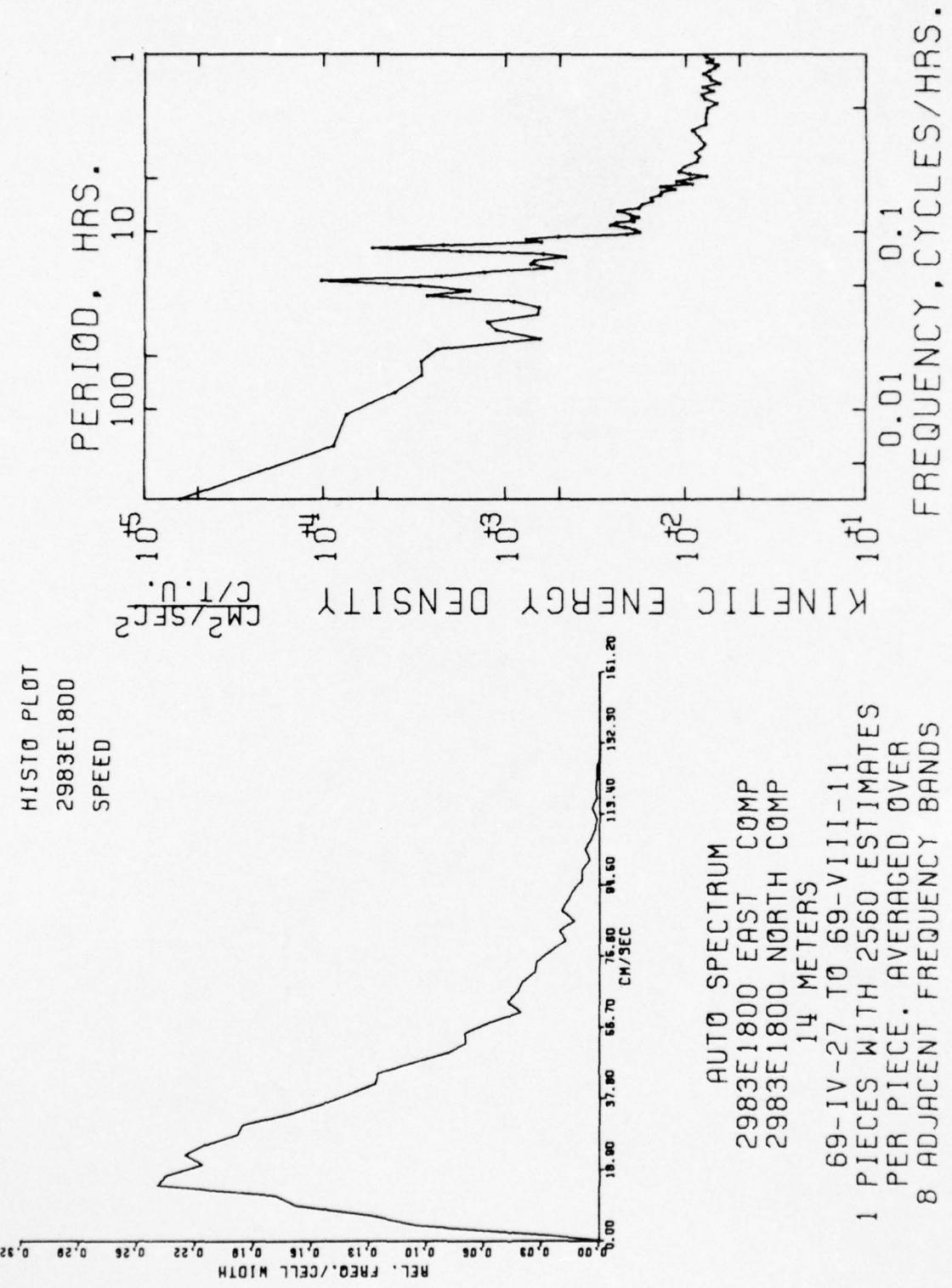
UNITS OF RAW DATA VARIABLES = MM/SEC

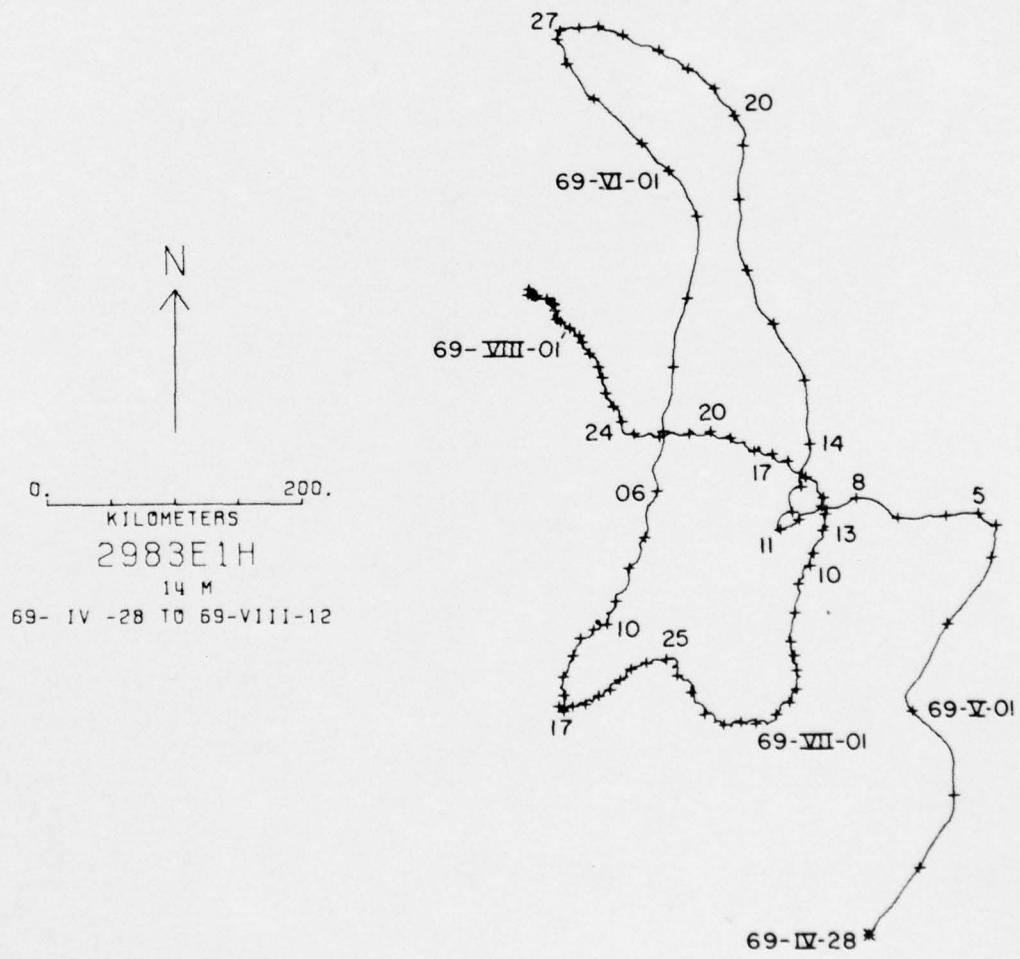
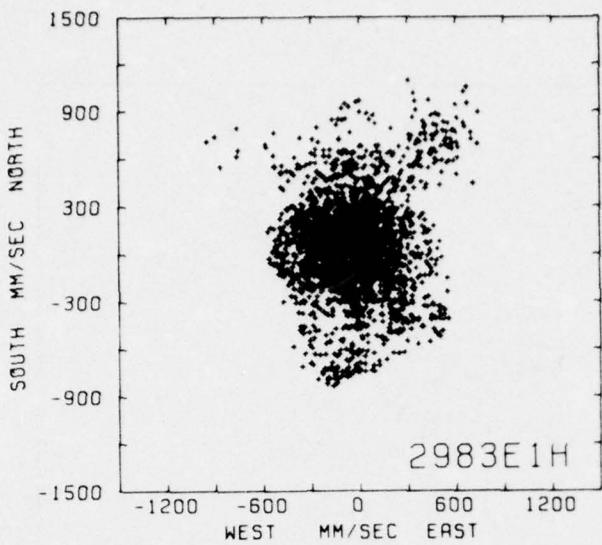
SAMPLE SIZE = 5153 POINTS

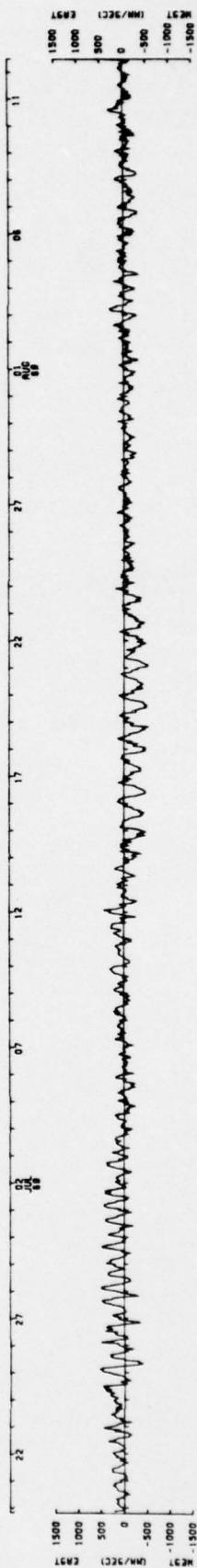
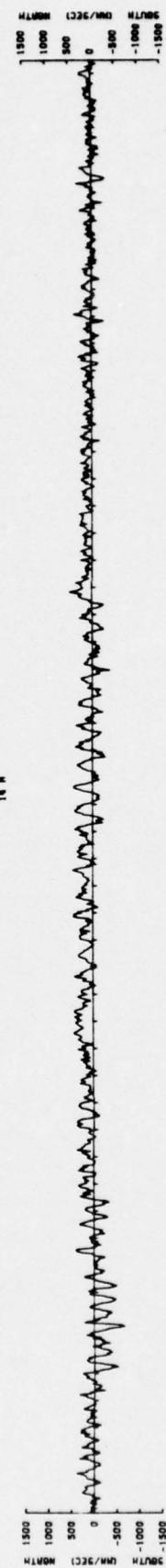
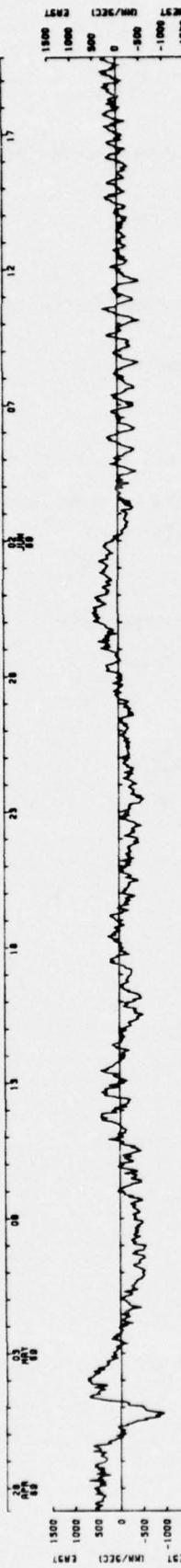
SPANNING RANGE

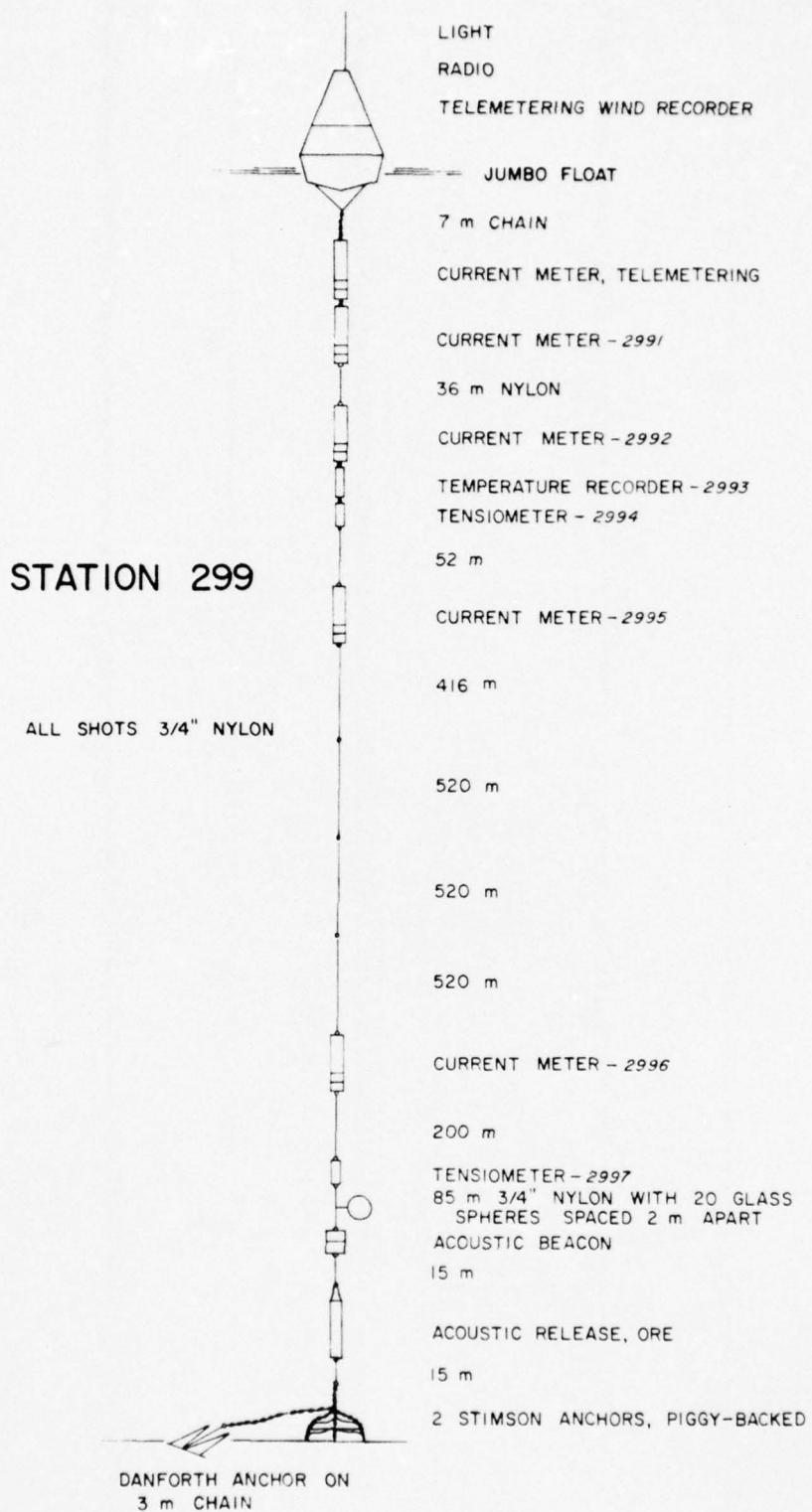
FROM 69- IV -27 03.45.07  
TO 69-VIII-12 11.45.07

DURATION 107 DAYS 8 H 0 M 0 S









Mooring No. 299

Set 69 Apr 29 39° 09.0N 70° 03.6W  
Year Month Day Latitude Longitude

Set by R. Heinmiller Ship R. V. Chain Cruise 90

Retrieved 69 May 15  
Year Month Day

Retrieved by J. Barrett Ship R. V. Chain Cruise 91

Purpose of Mooring: Two-month test of Jumbo telemetry on new 3/4" nylon, combined with the long-term scientific measurement series.

Mooring Type: Surface with Jumbo float.

Data Number	Instrument Number	Type	Depth Meters	Comments
2991*	M-203	M.C.M.	13	
2992*	M-214	M.C.M.	51	
2993	T 452	Temp. Rec.	52	
2994	1016	Tens.	53	
2995*	M-213	M.C.M.	107	
2996*	M-210	M.C.M.	2372	
2997	1014	Tens.	2572	

Water depth 2696

#### Hydrographic Station

R/V Chain cruise 90 Station 879

#### COMMENTS ON MOORING:

April 29 the Jumbo float went into the water upside down breaking the main crane on the R. V. Chain.

Telemetry inoperative.

May 9 telemetry repaired by Walden and Collins on the Captain Bill IV.

May 12 R. V. Chain reports Jumbo not on station.

May 15 Mooring recovered complete except for 40 meters of glass ball section which had been cut and the ends tangled together. Only 2 glass balls recovered.

Counter in release indicates it fired on May 6 between 11:00 and 11:30. Possibly by submarines operating in the area.

Data number 2991

Instrument No.: M-203

Type: Magnetic tape current meter

Depth: 13 m

Water depth: 2696 m

Start time: 69-IV-29 191630

Stop time: 69-V-15 100130

Duration: 15d 14h 45m

Sampling scheme: Interval

time between strobes = 5 seconds

no. of strobes per interval = 24

interval time = 900 seconds

COMMENTS:

Compass channel #2 is off when compass channel #1 is off; when channel #1 is on channel #2 looks O. K.

STATS

DATA/ 29910900

MEAN	EAST	NORTH	SPEED	EAST & NORTH	WWWWWW
STD. ERR.	-10.61	208.83	527.73	COVARIANCE	= 4989.63
VARIANCE	8.76	9.94	6.13	STD. ERR. OF COVARIANCE	= 4535.82
STD. DEV.	142986.45	148229.08	56443.82	STD. DEV. OF COVARIANCE	= 175671.74
KURTOSIS	378.14	385.01	237.58	CORRELATION COEFFICIENT	= .034
SKEWNESS	1.81	2.83	3.87	VECTOR MEAN	= 209.10
	.11	.21	.97	VECTOR VARIANCE	= 145607.77
				" STD. DEV.	= 381.59

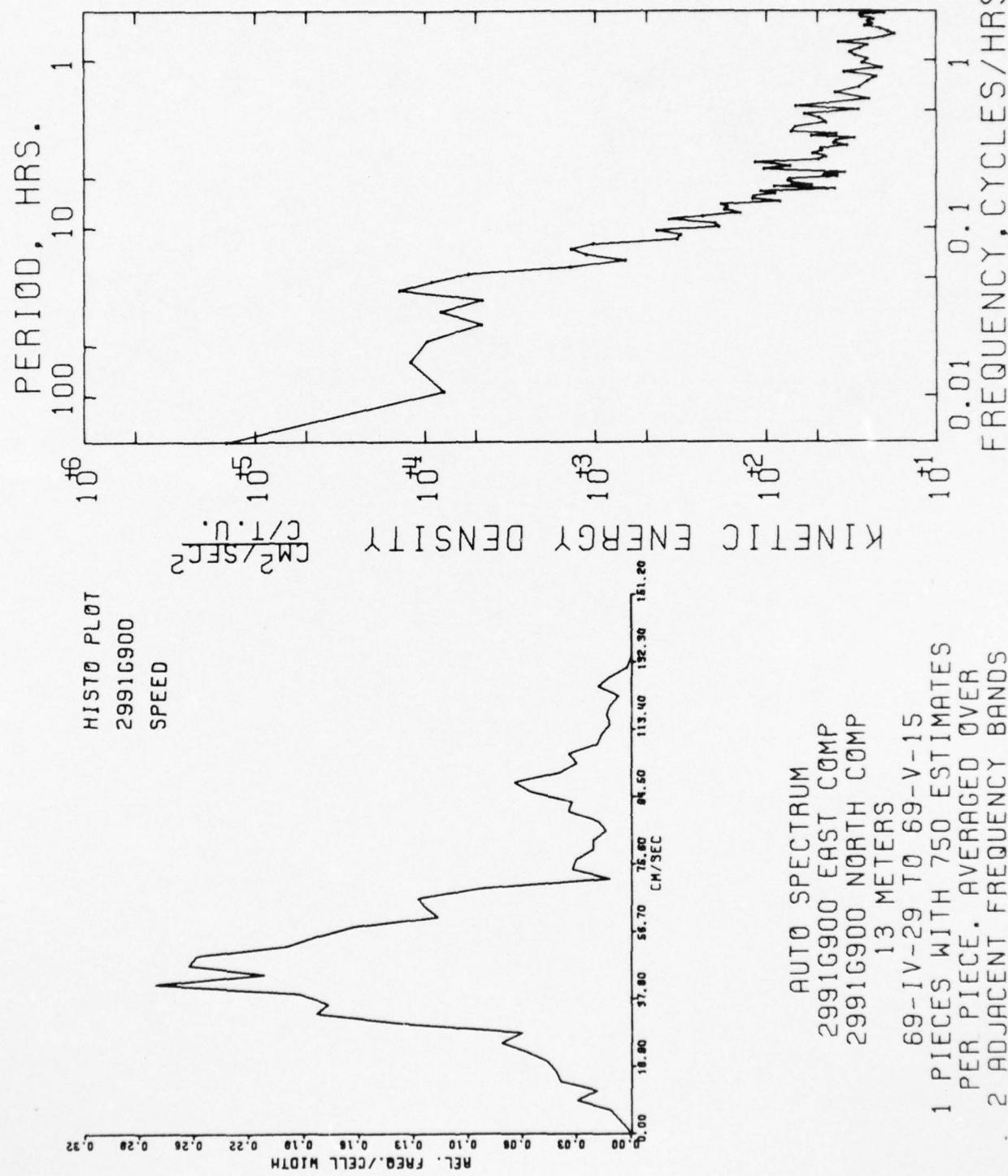
UNITS OF RAW DATA VARIABLES = MM/SEC

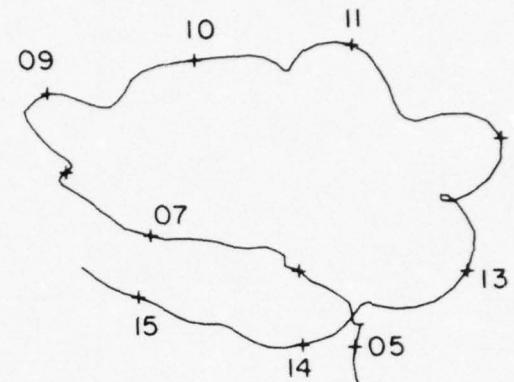
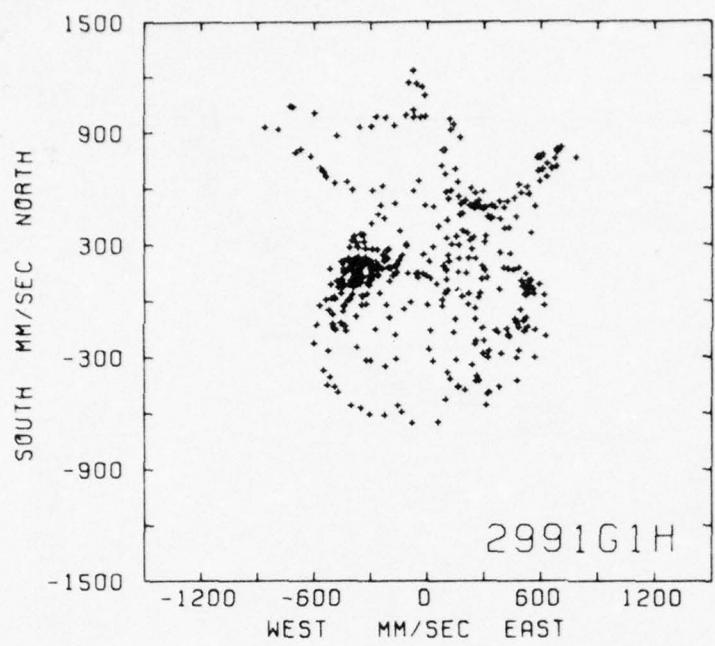
SAMPLE SIZE = 1500 POINTS

SPANNING RANGE

FROM 69- IV -29 19.16.30  
TO 69- V -15 10.01.30

DURATION 15 DAYS 14 H 45 M 0 S



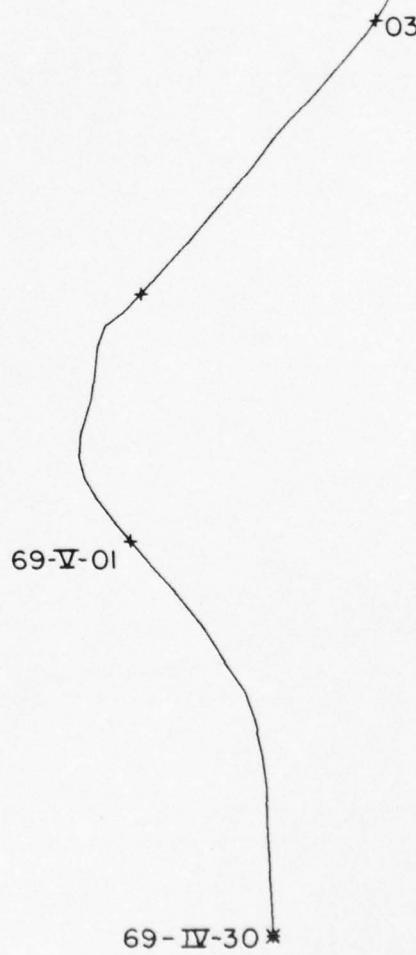


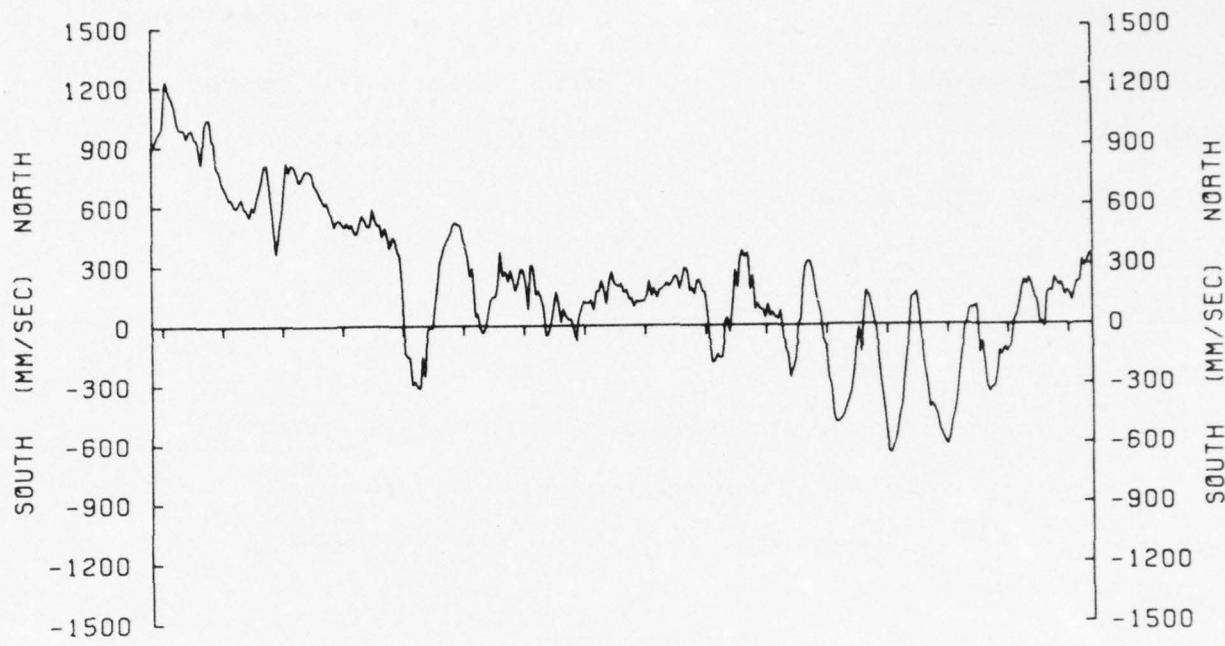
0.                    60.  
KILOMETERS

2991G1H

13 M

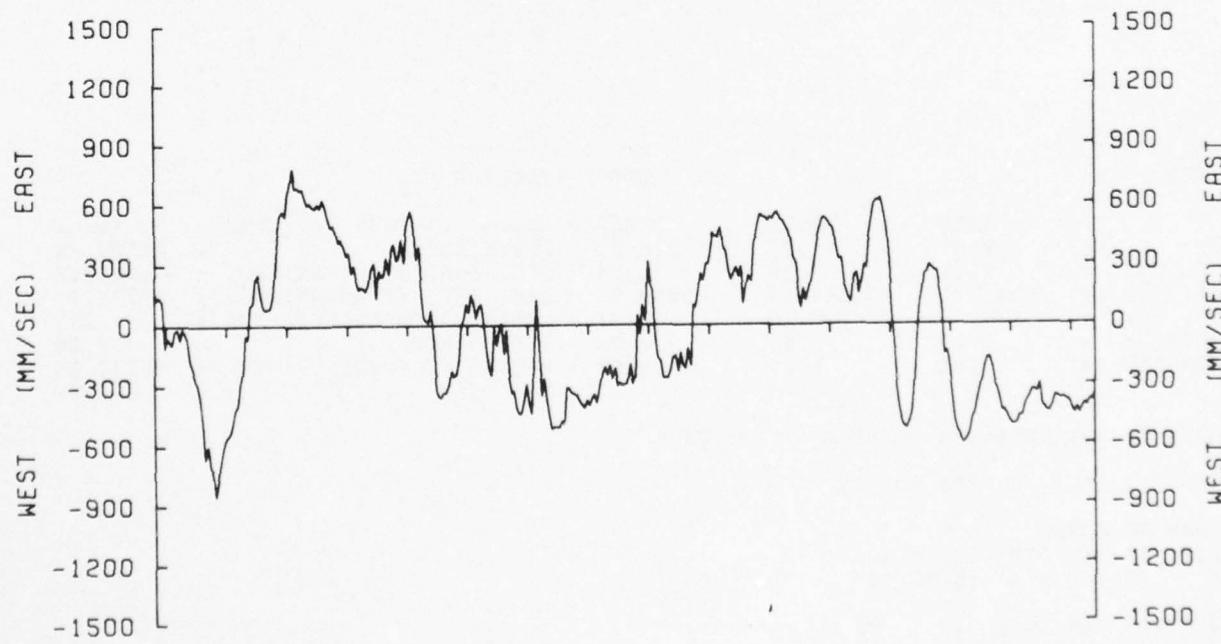
69- IV -30 TO 69- V -15





2991G1H  
13 M

30 APR 69 05 MAY 69 10 15



✓ AD-A031 858

WOODS HOLE OCEANOGRAPHIC INSTITUTION MASS  
A COMPILATION OF MOORED CURRENT DATA AND ASSOCIATED OCEANOGRAPH--ETC(U)  
MAY 76 S A TARBELL  
WHOI-76-40

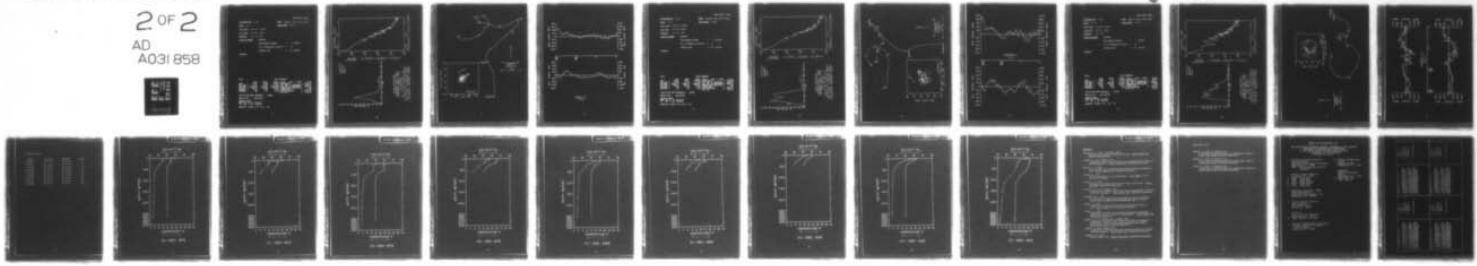
F/G 8/3

N00014-66-C-0241

UNCLASSIFIED

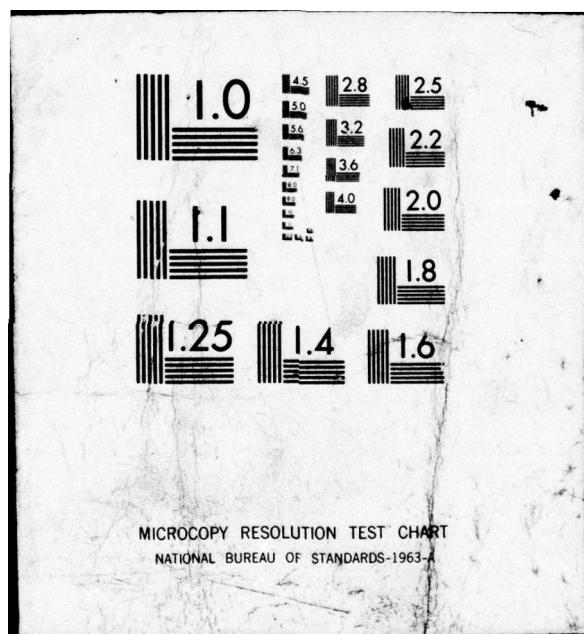
NL

2 OF 2  
AD  
A031 858



END

DATE  
FILED  
12-76



Data number 2992

Instrument No.: M-214

Type: Magnetic tape current meter

Depth: 51 m

Water depth: 2696 m

Start time: 69-IV-29 202040

Stop time: 69-V-15 100540

Duration: 15d 13h 45m

Sampling scheme: Interval

time between strobes	=	5 seconds
no. of strobes per interval	=	24
interval time	=	900 seconds

COMMENTS:

STATS

DATA/ 2992C900

MEAN	=	EAST	52.87	NORTH	101.80	SPEED	=	NNNNN	EAST & NORTH	=	NNNNN
STD. ERR.	=		8.01		7.20	318.36	=	COVARIANCE		=	21551.26
VARIANCE	=		54097.70		77504.97	5.38	=	STD. ERR. OF COVARIANCE	=		1989.53
STD. DEV.	=		232.46		278.40	43378.86	=	STD. DEV. OF COVARIANCE	=		76851.37
KURTOSIS	=		9.07		4.65	208.27	=	CORRELATION COEFFICIENT	=		.333
SKEWNESS	=		.85		1.21	4.93	=	VECTOR MEAN	=		114.85
						1.53	=	VECTOR VARIANCE	=		85771.34
							=	* STD. DEV.	=		256.46

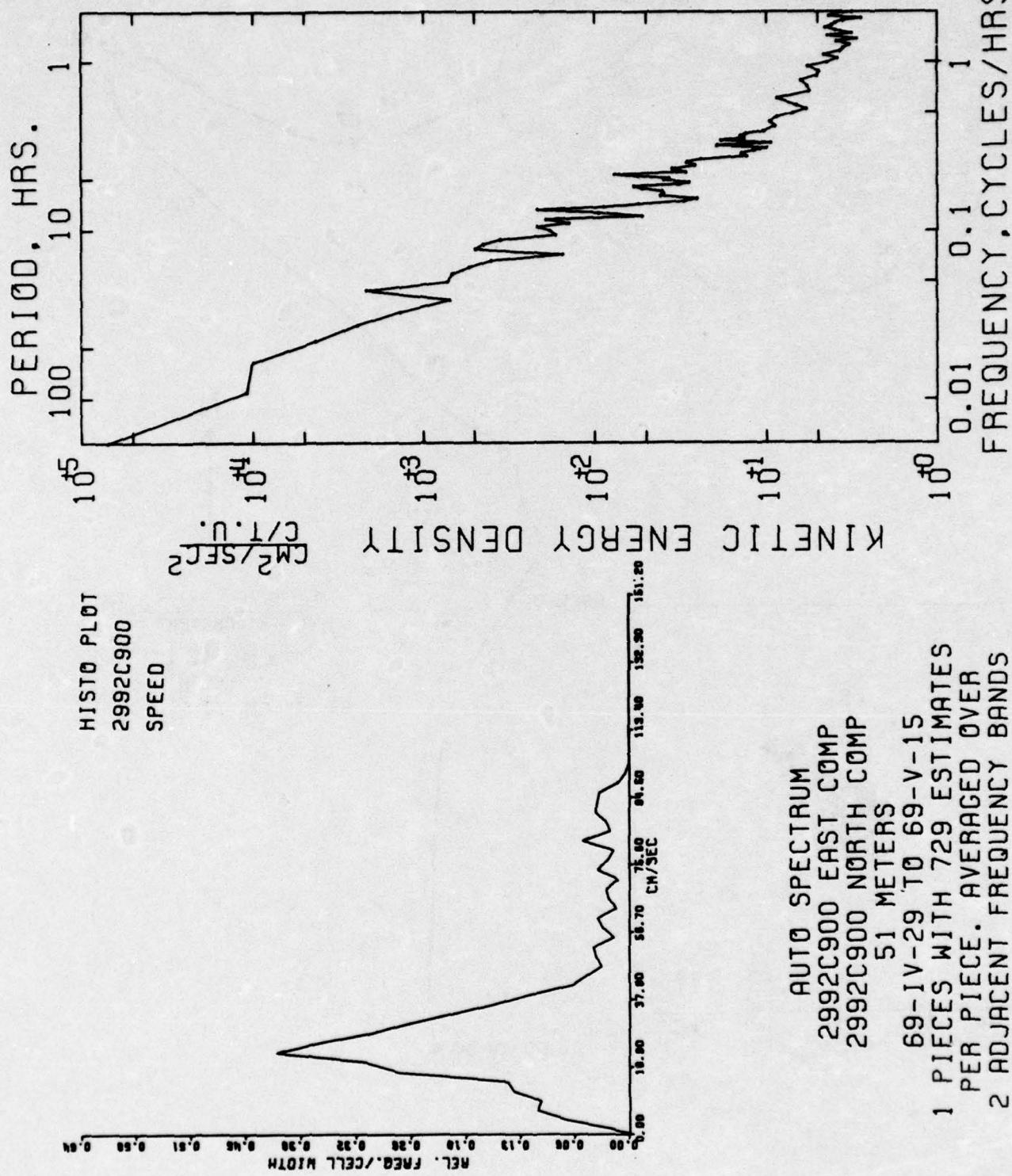
UNITS OF RAW DATA VARIABLES = MM/SEC

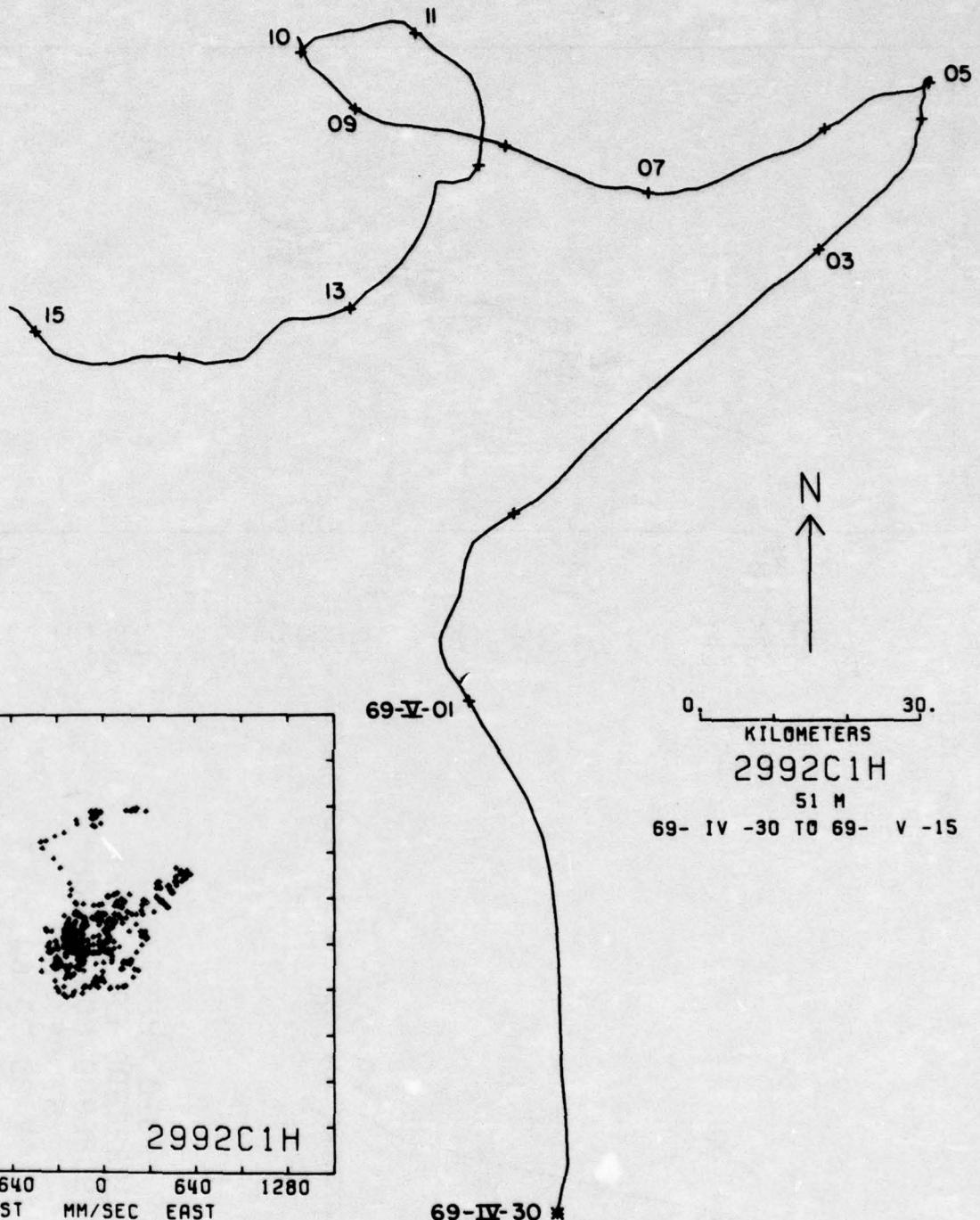
SAMPLE SIZE = 1486 POINTS

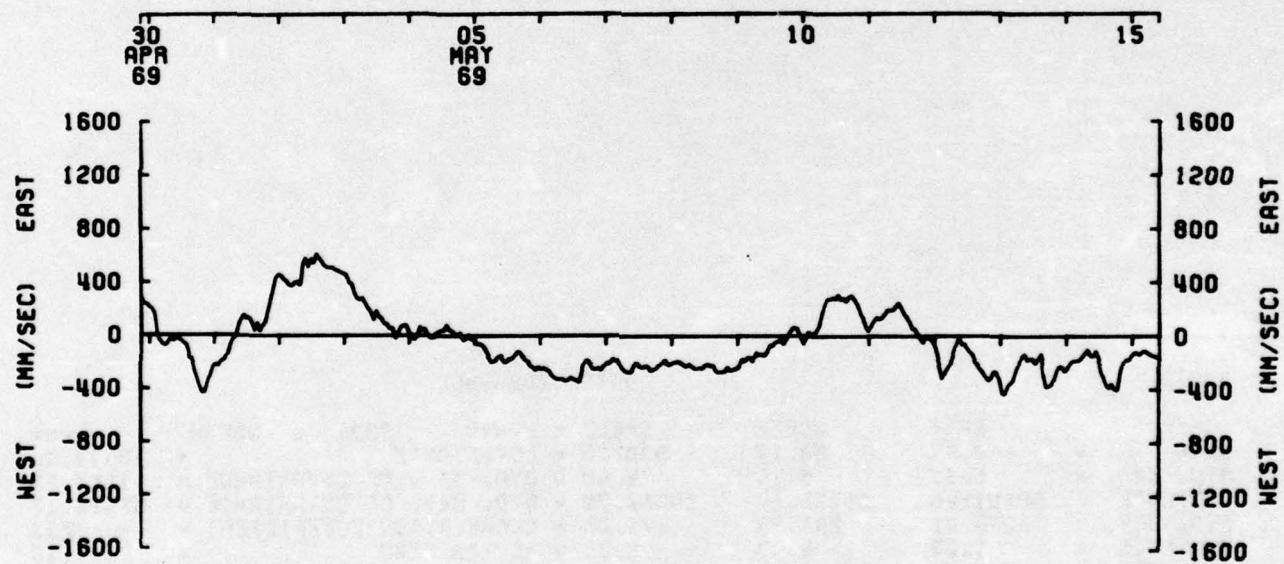
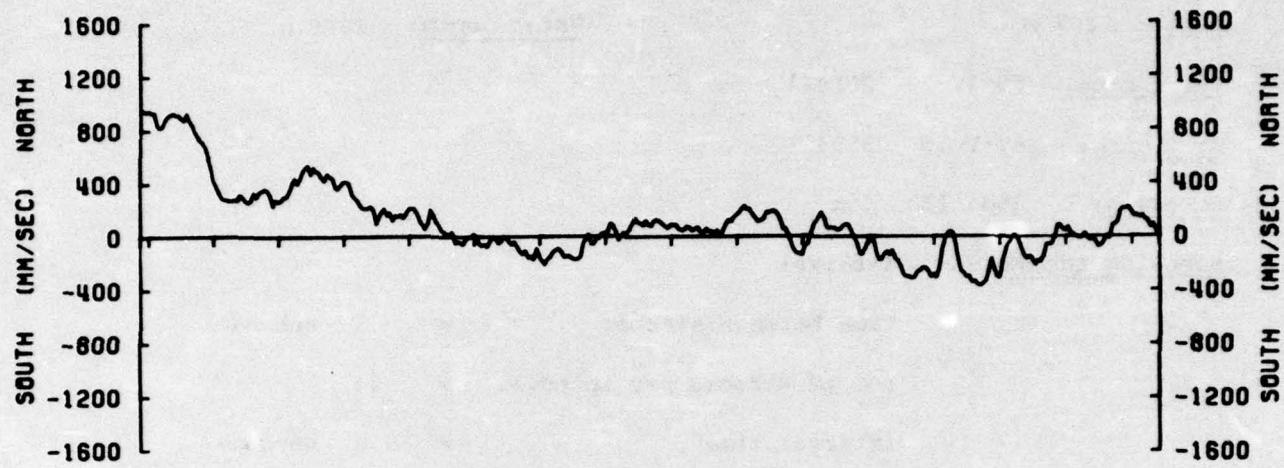
SPANNING RANGE

FROM 69- IV -29 20.20.40  
TO 69- V -15 10.05.40

DURATION 15 DAYS 13 H 45 M 0 S







299201H  
51 M

Data number 2995

Instrument No.: M-213

Type: Magnetic tape current meter

Depth: 107 m

Water depth: 2696 m

Start time: 69-IV-29 201440

Stop time: 69-V-15 095940

Duration: 15d 13h 45m

Sampling scheme: Interval

time between strobes = 5 seconds  
no. of strobes per interval = 24  
interval time = 900 seconds

COMMENTS:

STATS

	EAST	NORTH
MEAN	-60.84	83.17
STD. ERR.	5.09	8.76
VARIANCE	50801.40	68408.14
STD. DEV.	225.61	281.55
KURTOSIS	1.97	4.47
SKEWNESS	.26	.94

DATA/ 2995B900

SPEED	NNNNN	EAST & NORTH	NNNNN
320.00	COVARIANCE	=	13772.09
4.42	STD. ERR. OF COVARIANCE	=	1383.09
29288.76	STD. DEV. OF COVARIANCE	=	53526.17
171.08	CORRELATION COEFFICIENT	=	.293
5.54	VECTOR MEAN	=	111.18
1.40	VECTOR VARIANCE	=	58854.77
	STD. DEV.	=	244.24

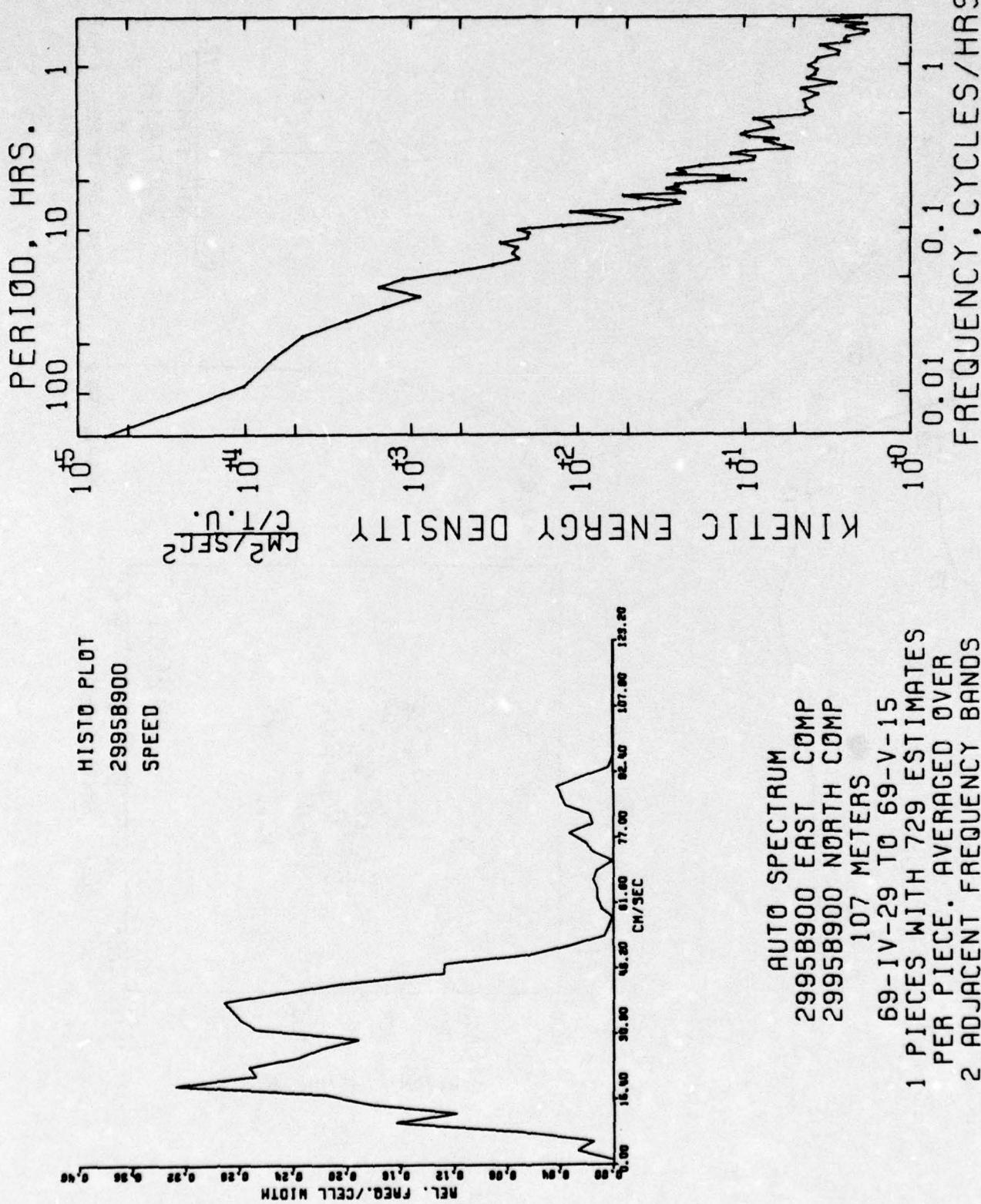
UNITS OF RAW DATA VARIABLES = MM/SEC

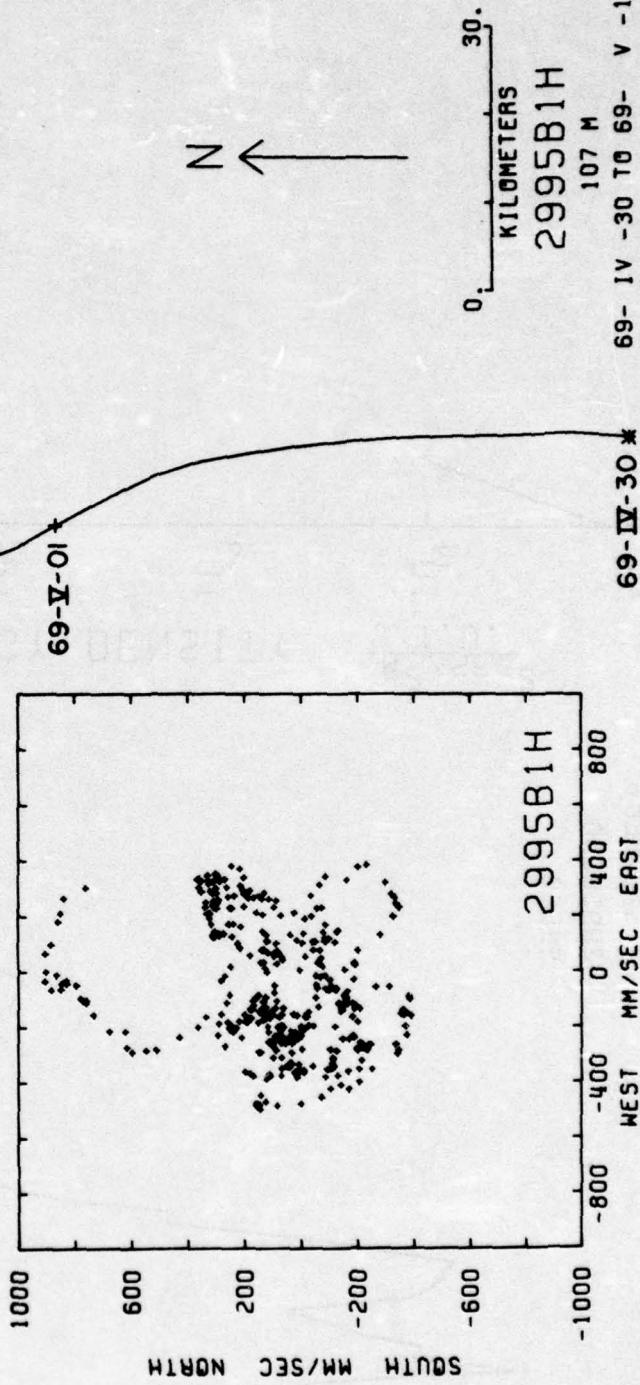
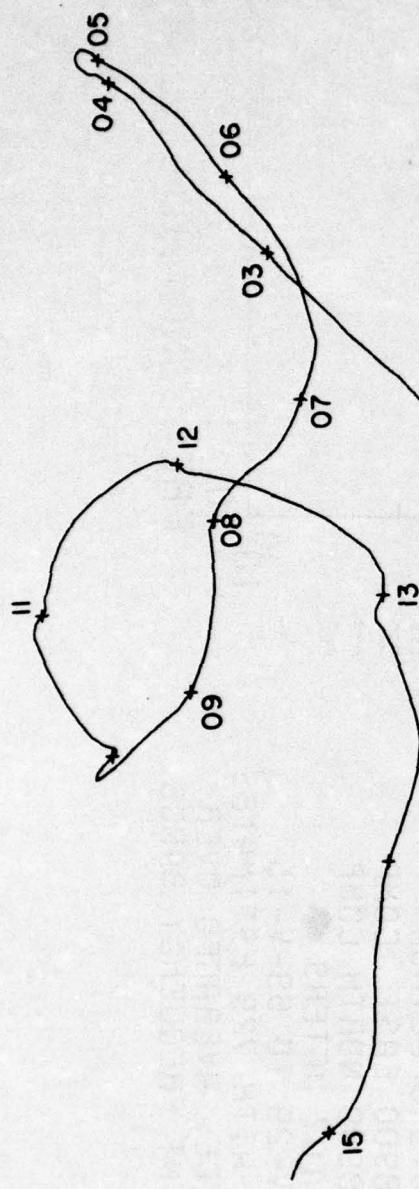
SAMPLE SIZE = 1496 POINTS

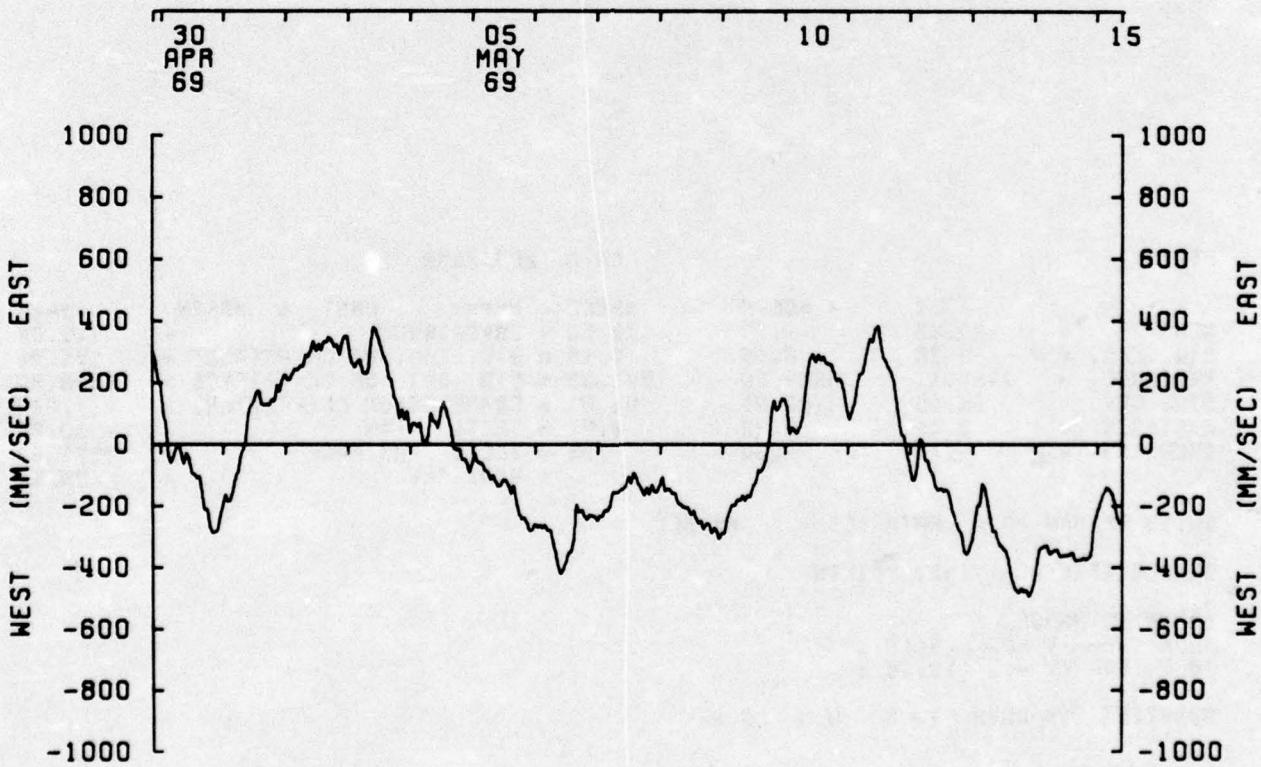
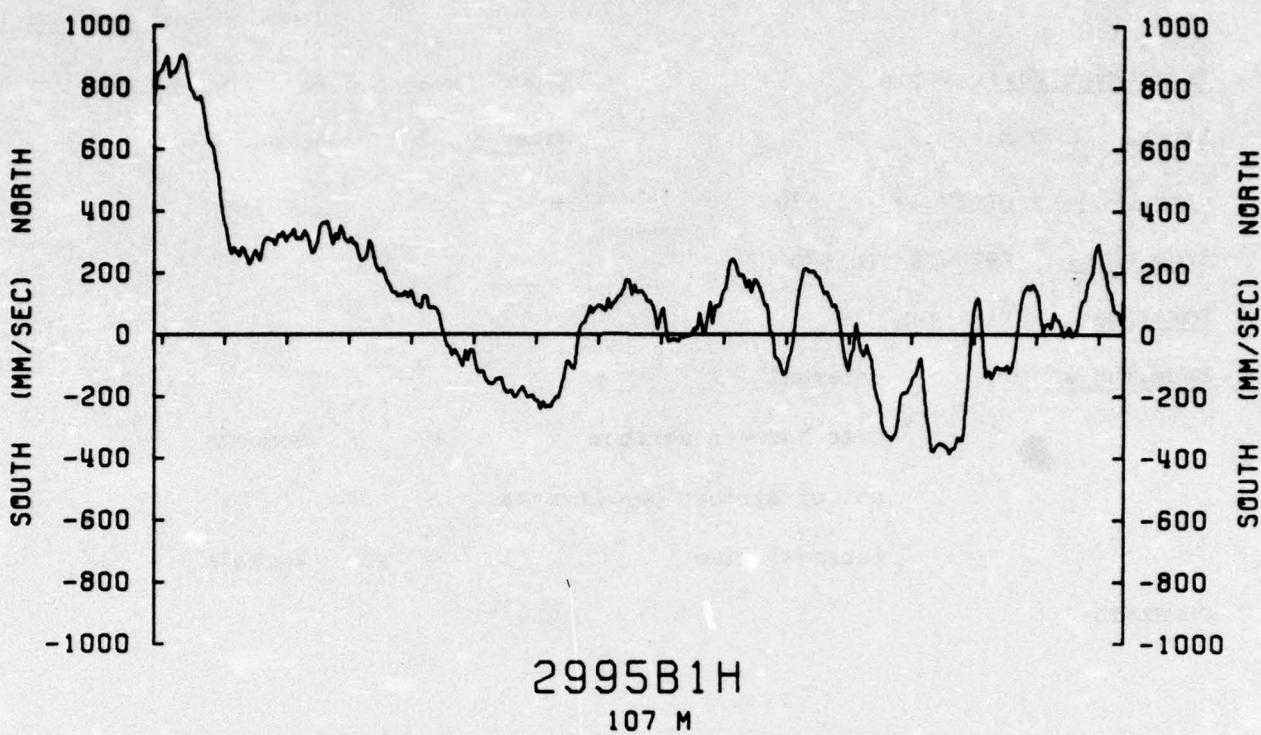
SPANNING RANGE

FROM 69- IV -29 20.14.40  
TO 69- V -15 09.59.40

DURATION 15 DAYS 13 H 45 M 0 S







Data number 2996

Instrument No.: M-210

Type: Magnetic tape current meter

Depth: 2372 m

Water depth: 2696 m

Start time: 69-IV-29 201830

Stop time: 69-V-15 101830

Duration: 15d 14h

Sampling scheme: Interval

time between strobes	=	5	seconds
no. of strobes per interval	=	24	
interval time	=	900	seconds

COMMENTS:

**STATS**

	EAST	NORTH
MEAN	-30.29	.77
STD. ERR.	2.28	2.15
VARIANCE	7754.11	6807.96
STD. DEV.	88.06	82.99
KURTOSIS	2.41	2.42
SKEWNESS	.28	-.90

**DATA/ 2996F900**

SPEED	=	MMMM	EAST & NORTH	=	MMMM
118.05	=	COVARIANCE		=	715.02
1.13	=	STD. ERR. OF COVARIANCE		=	175.71
1801.88	=	STD. DEV. OF COVARIANCE		=	8798.30
49.61	=	CORRELATION COEFFICIENT		=	.098
2.61	=	VECTOR MEAN		=	30.24
.53	=	VECTOR VARIANCE		=	7921.04
	=	STD. DEV.		=	85.56

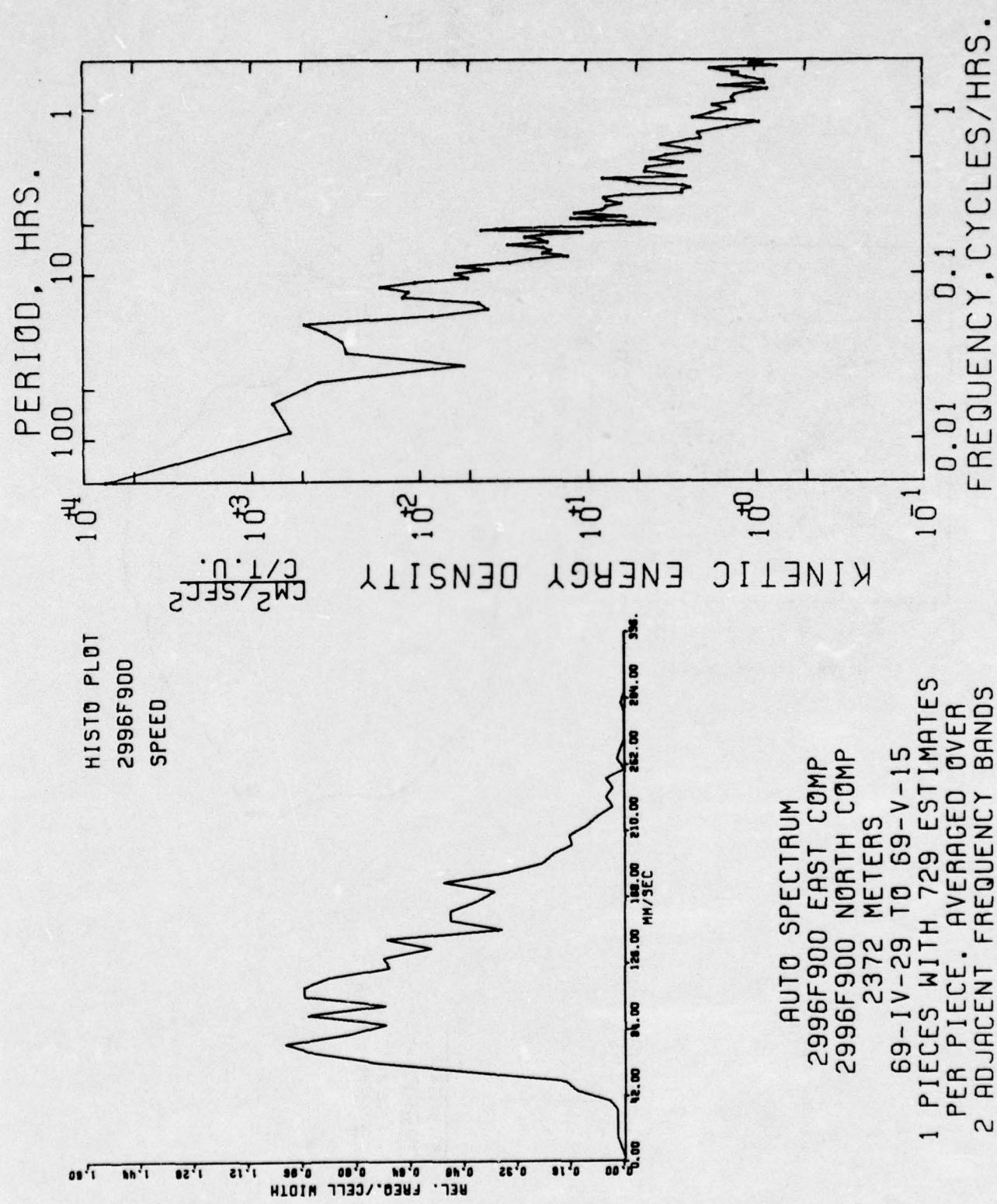
UNITS OF RAW DATA VARIABLES = MM/SEC

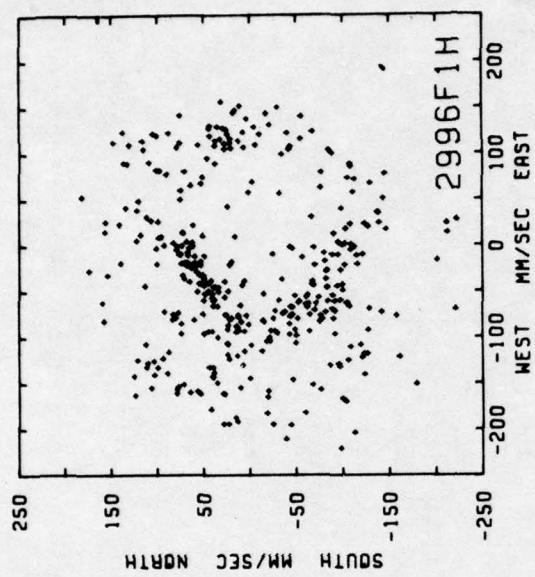
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**SPANNING RANGE**

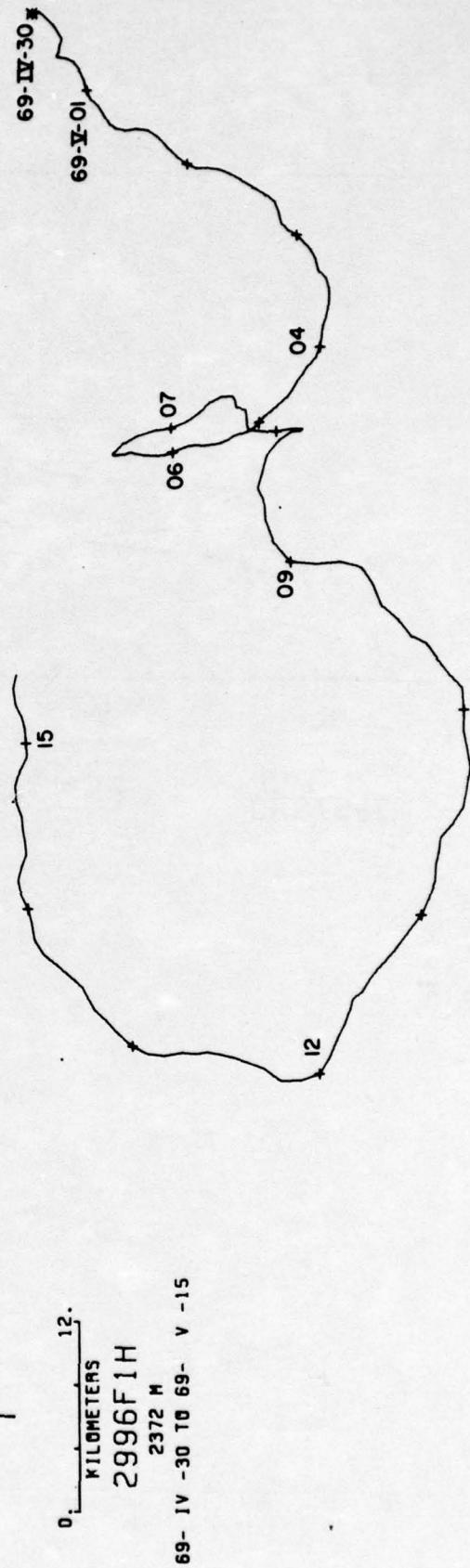
FROM 69- IV -29 20.18.90  
TO 69- V -15 10.18.90

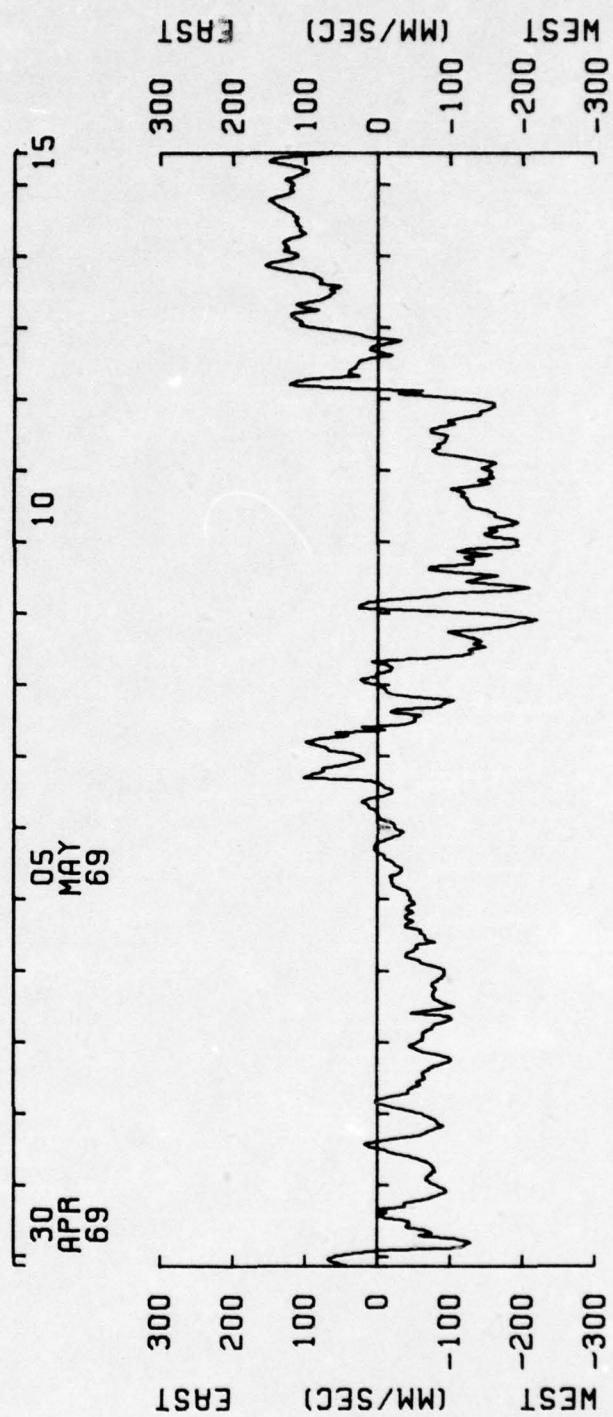
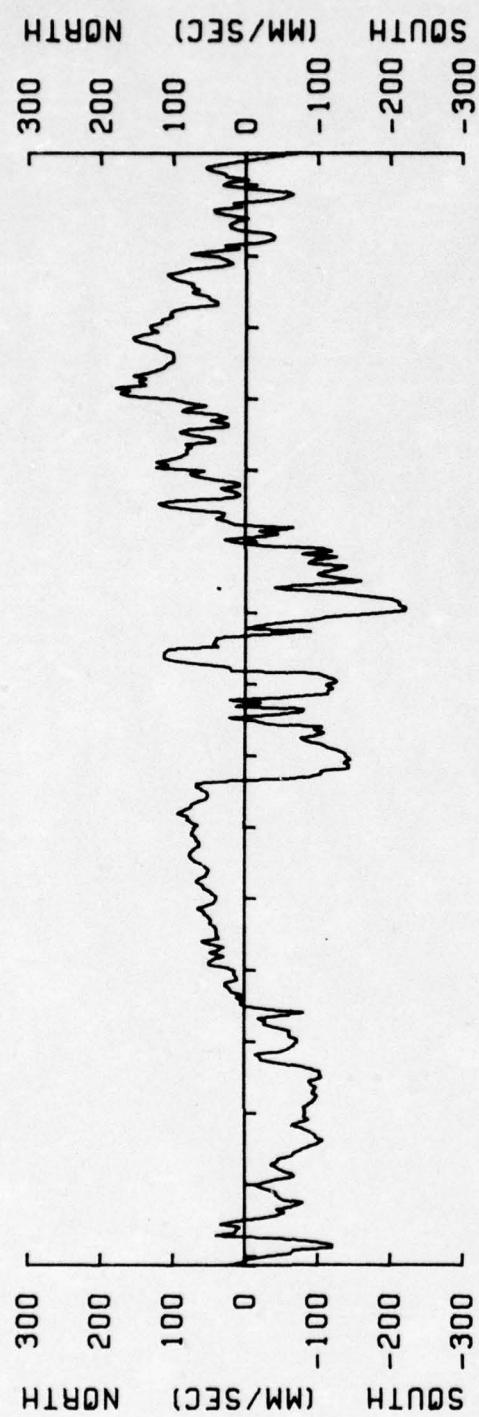
DURATION 15 DAYS 14 H 0 M 0 S





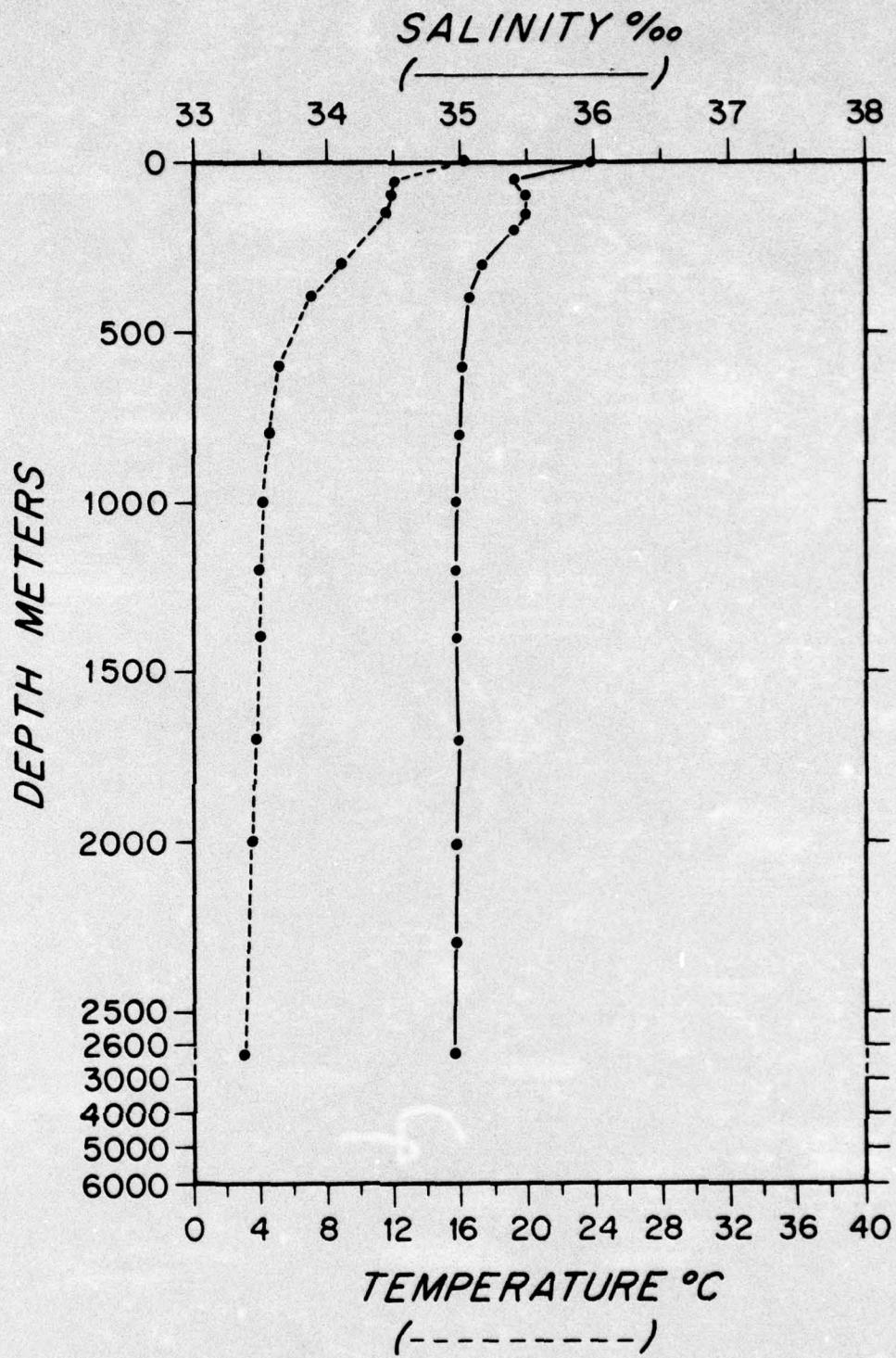
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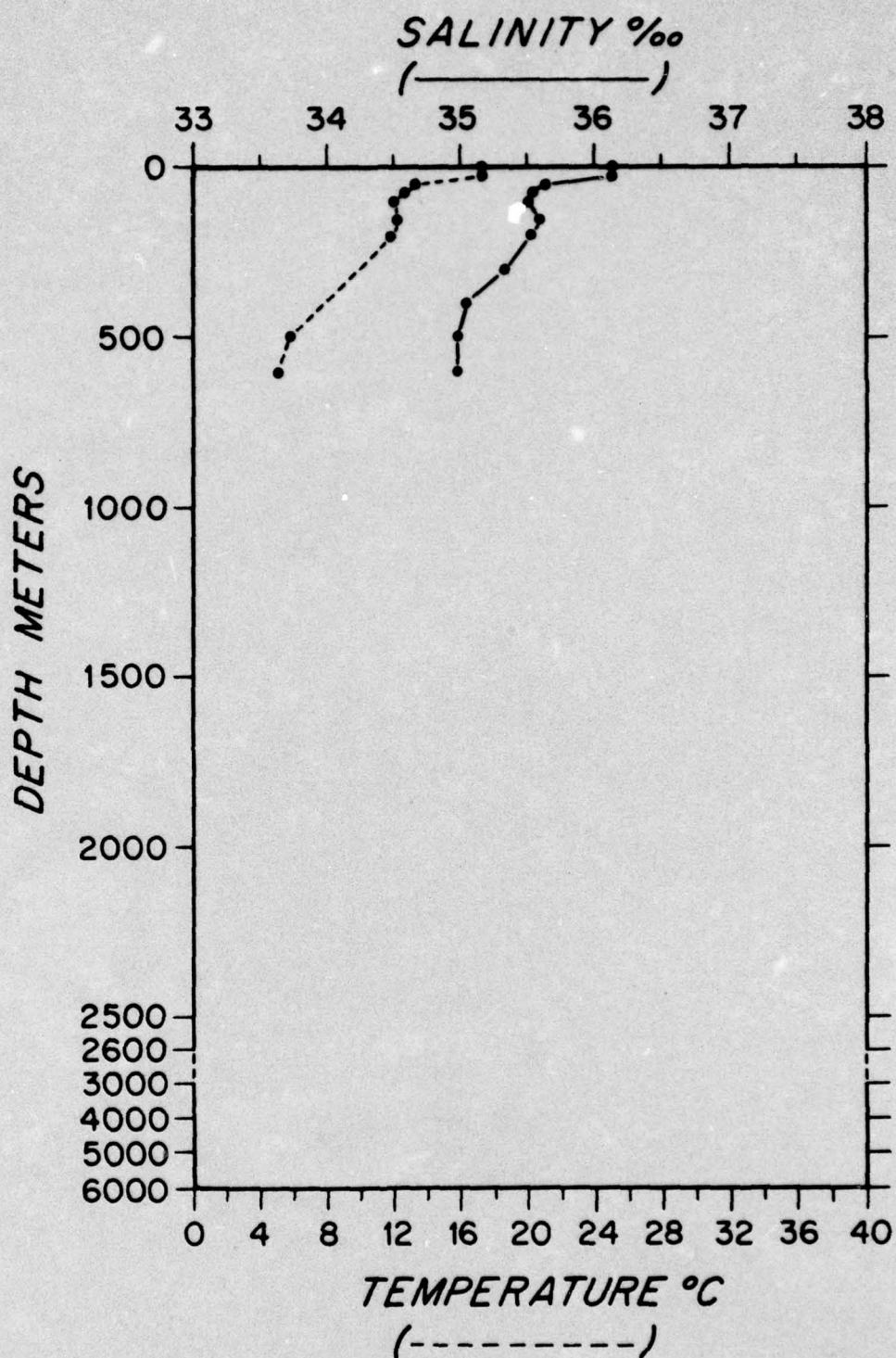


Hydrostation Data

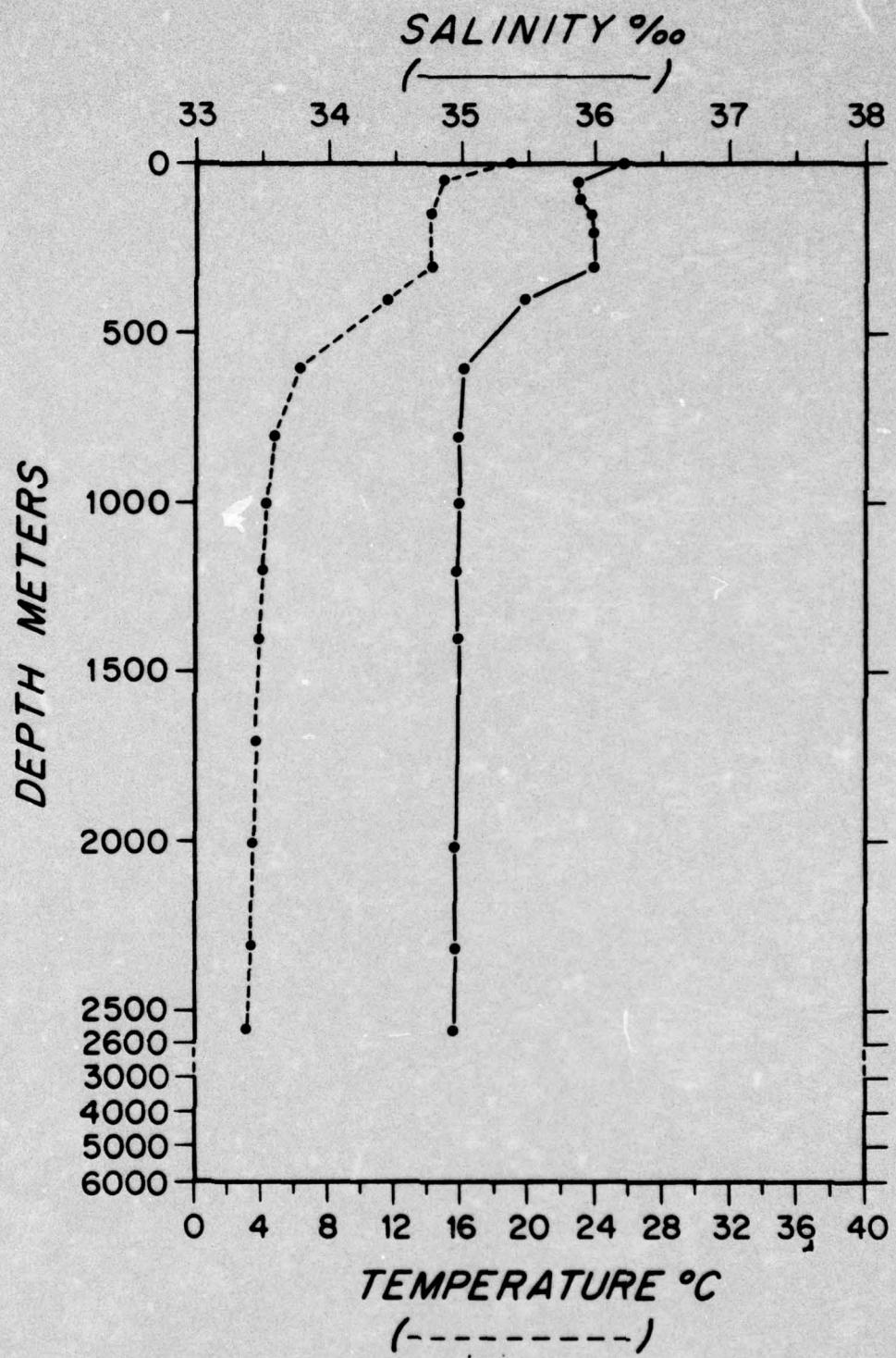
Number	Latitude	Longitude	Page
CI-90-872	39° 11.7'N	70° 02.6'W	92
CI-90-873	39° 11.3'N	70° 00.0'W	94
CI-90-878	39° 10.5'N	70° 00.0'W	96
CI-90-879	39° 10.5'N	70° 02.2'W	98
CI-92-896	39° 07.0'N	70° 00.0'W	100
CI-92-898	39° 02.3'N	70° 02.8'W	102
CI-92-903	39° 09.4'N	70° 06.5'W	104
CI-95-922	39° 10.5'N	70° 06.5'W	106
CI-95-924	34° 01.0'N	70° 04.7'W	108



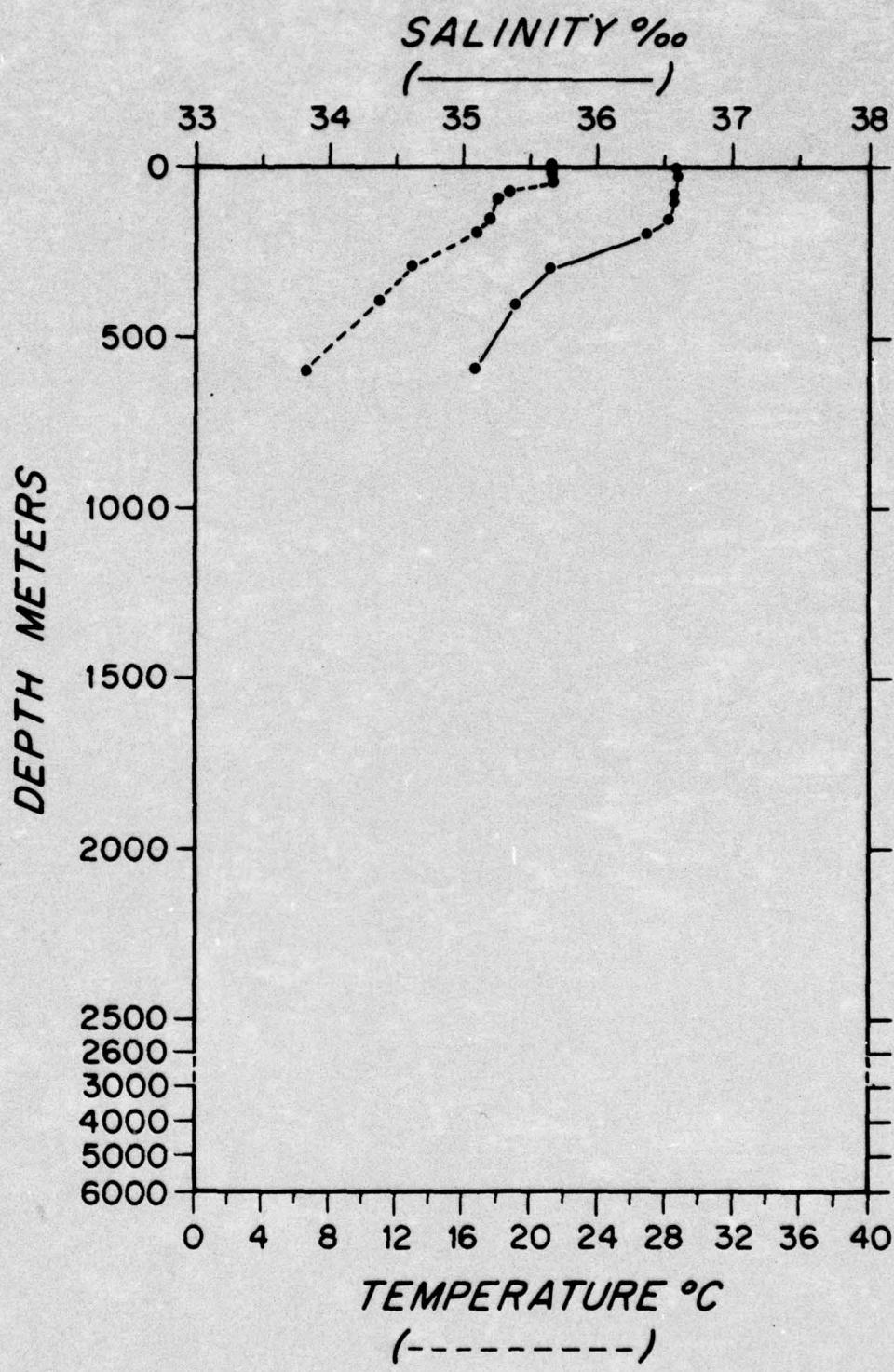
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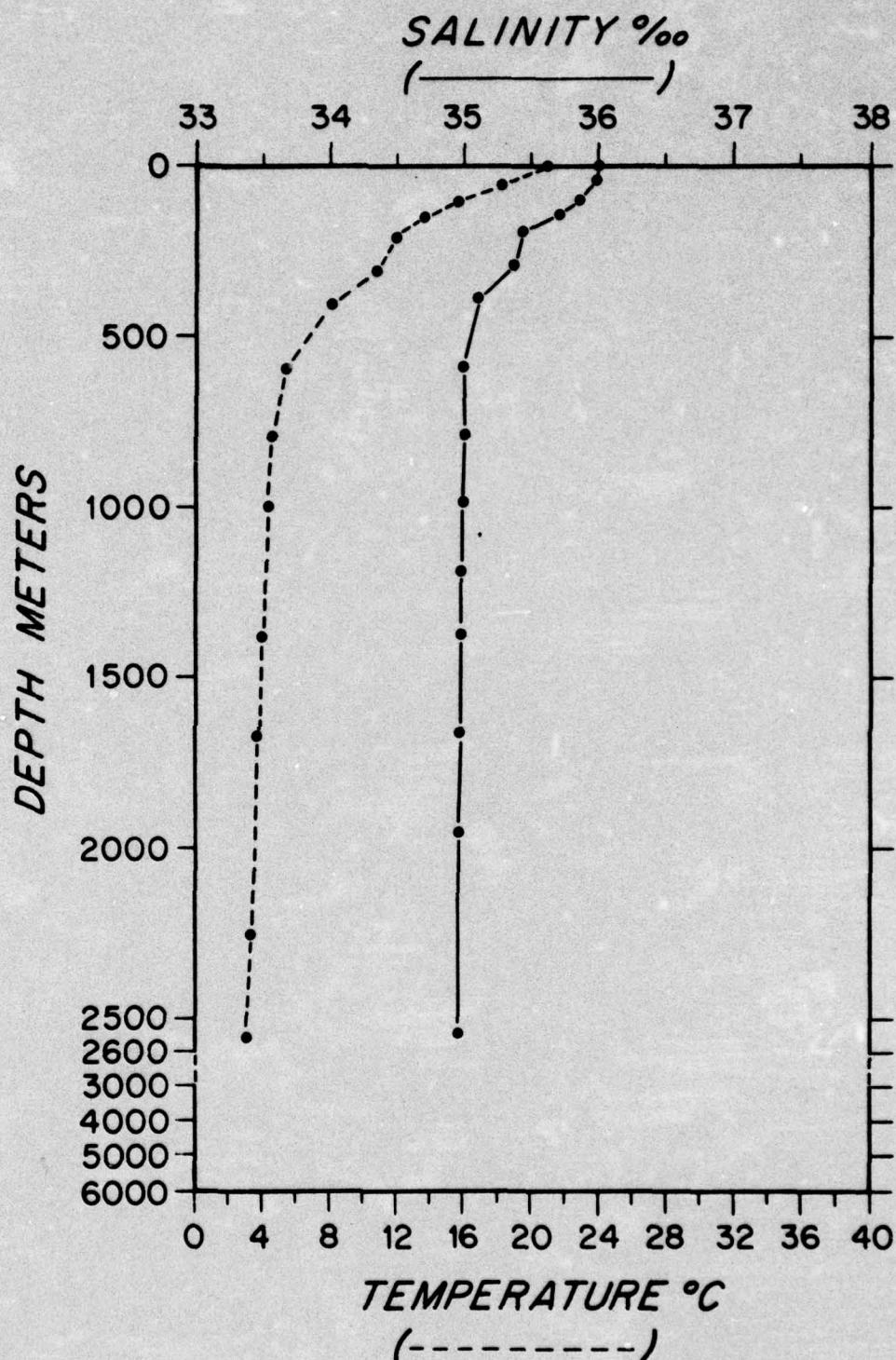
CI - 090 - 873



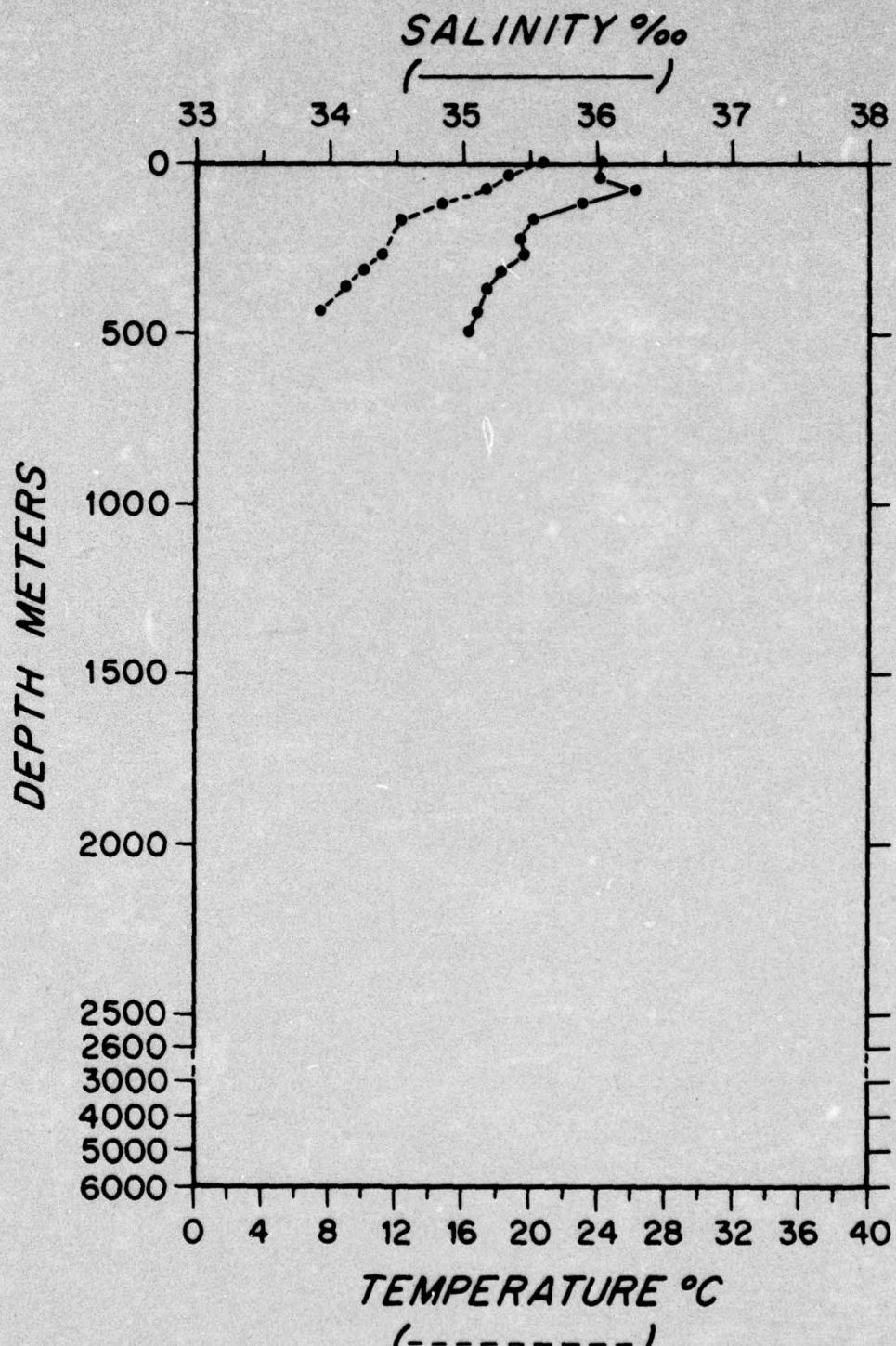
CI-090-878



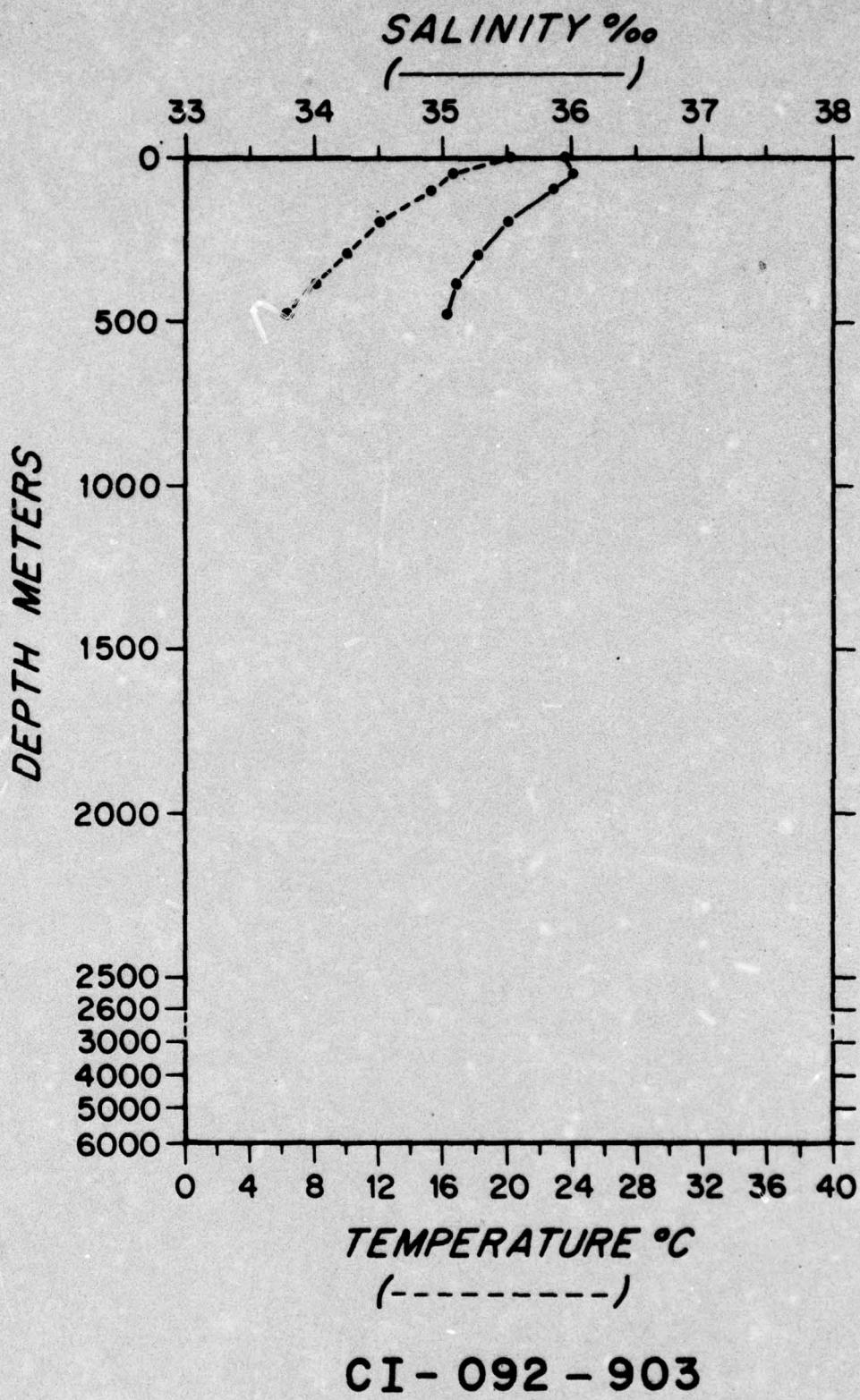
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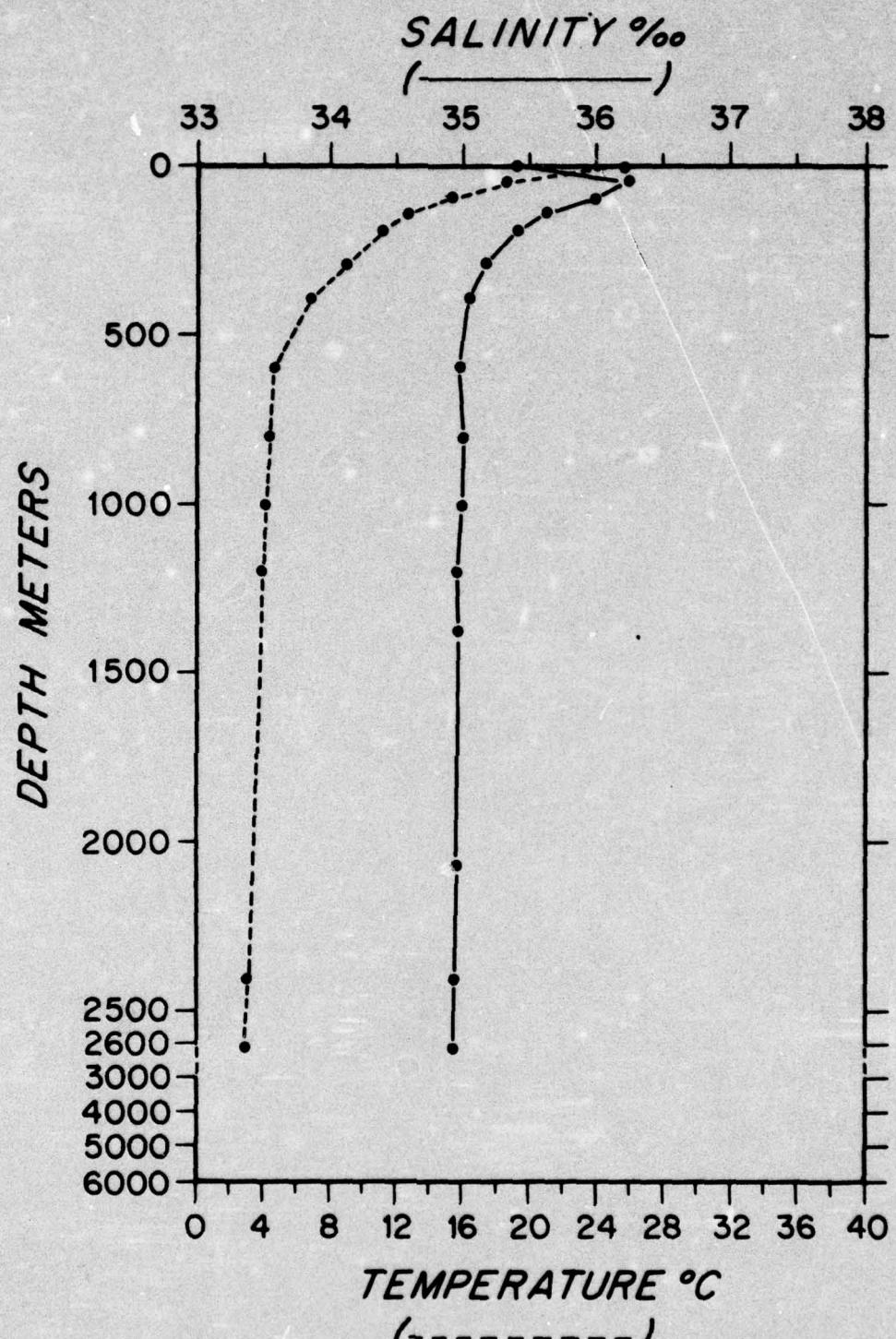


CI - 092 - 896

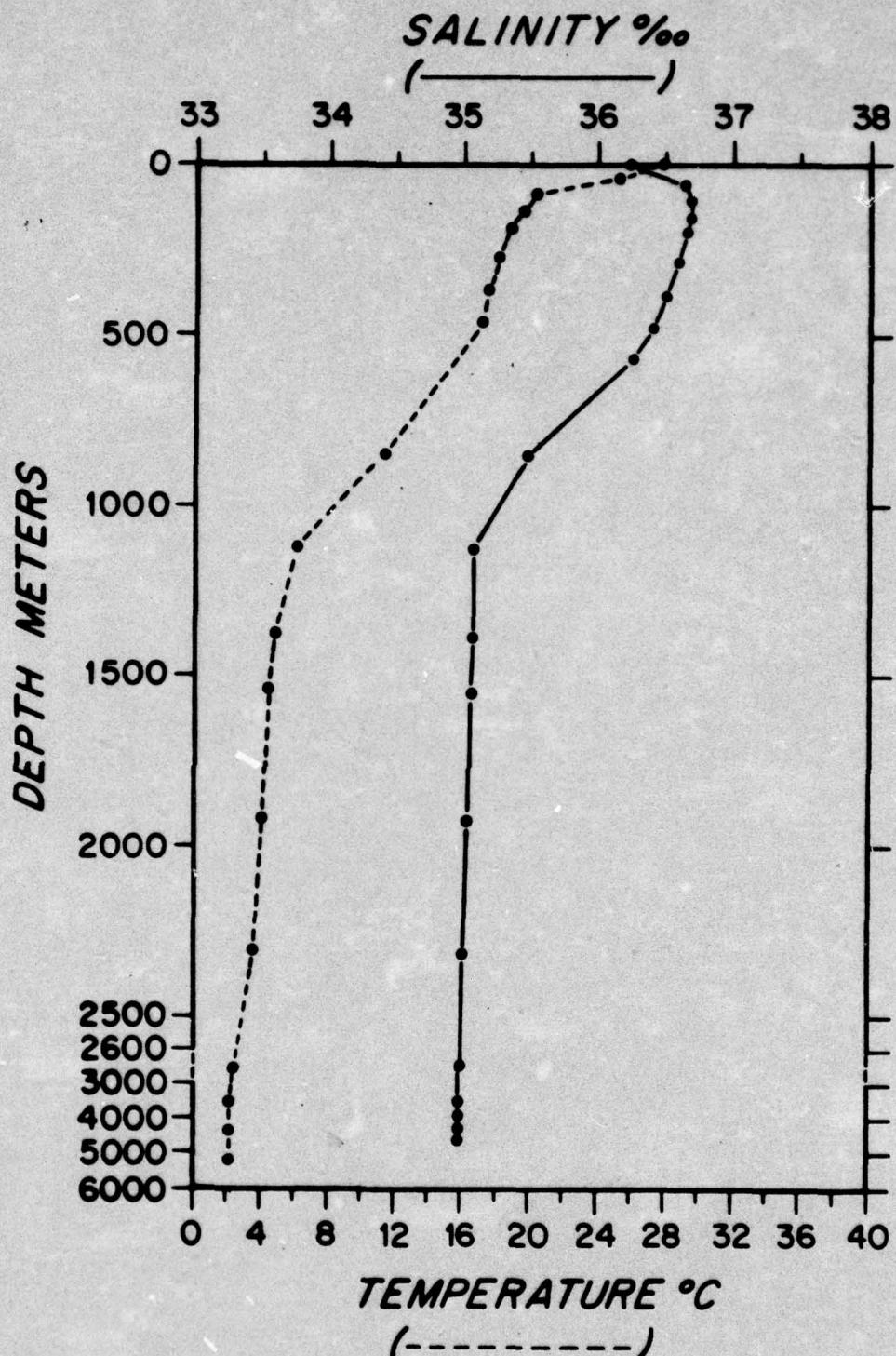


CI - 092 - 898





CI - 095 - 922



CI - 095 - 924

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Averaged wind and current quantities are  
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